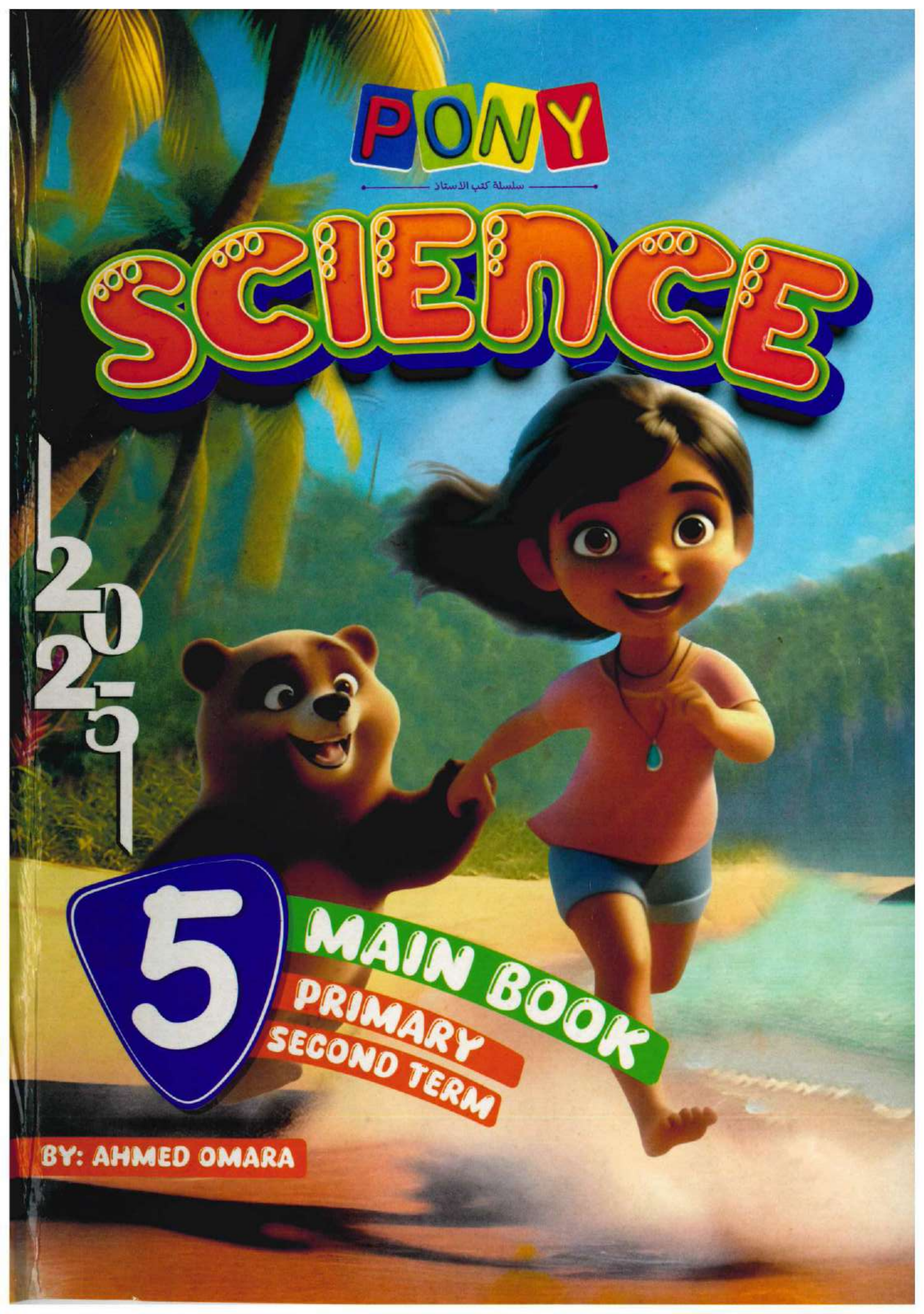

PONY
سلسلة كتب الاستاذ
SCIENCE
2025
5
MAIN BOOK
PRIMARY
SECOND TERM
BY: AHMED OMARA

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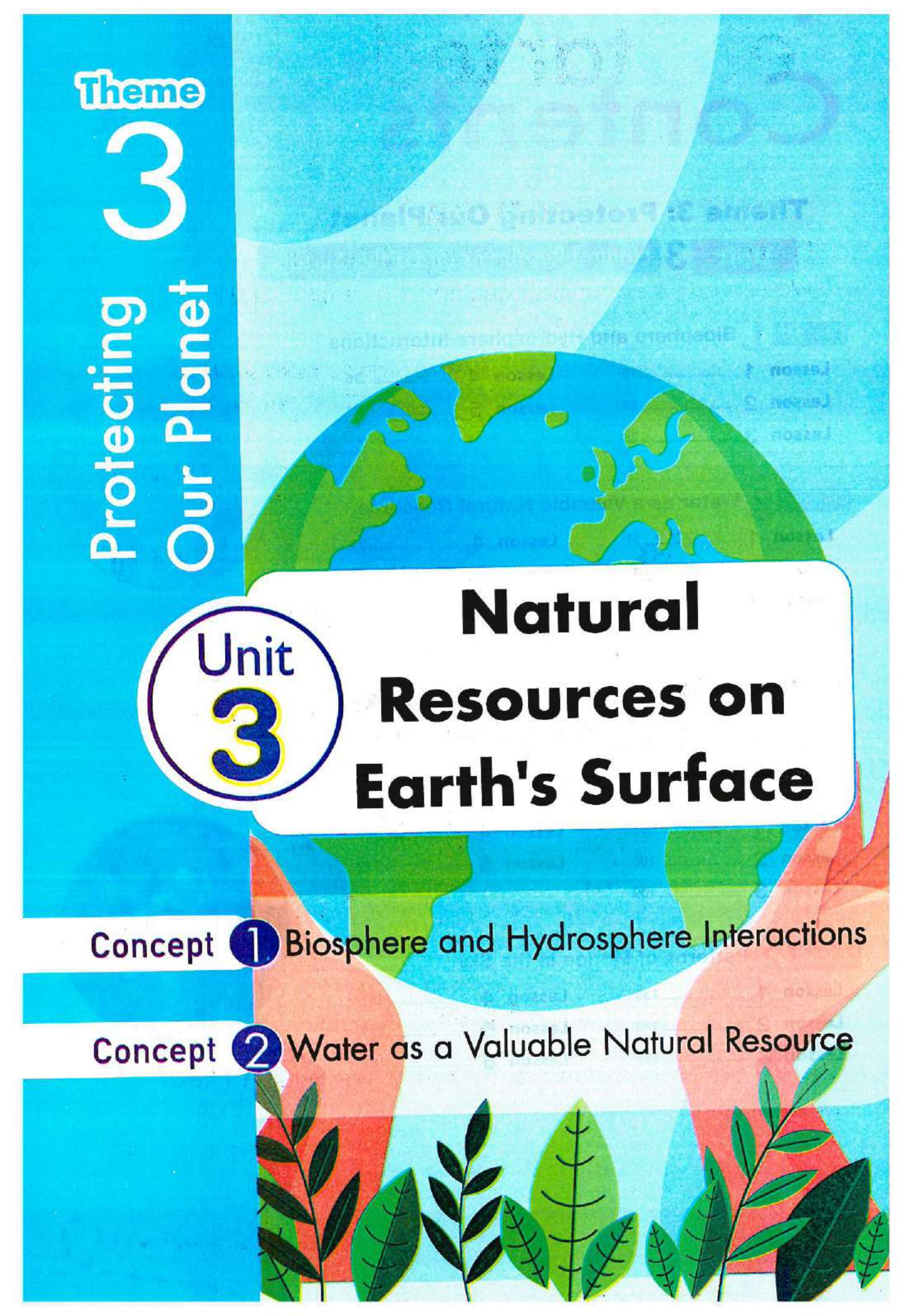
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Theme 3
Protecting Our Planet
Unit 3
Natural Resources on Earth's Surface
Concept 1 Biosphere and Hydrosphere Interactions
Concept 2 Water as a Valuable Natural Resource

Get Started
What I Already Know

Conserving Water

- Most of the Earth's surface is covered with water.
- Water is found everywhere on Earth, where it is found in oceans, seas, rivers, lakes, and even underground.
- Fresh water is important for all living organisms to survive.

• معظم سطح الأرض مُغطى بالماء.
• توجد المياه في كل مكان على الأرض؛ حيث توجد في المحيطات والبحار والأنهار والبحيرات وتحت الأرض.
• الماء العذب مهم جدًّا لبقاء جميع الكائنات الحية.



• There are many problems that threaten the resources of fresh water on Earth such as pollution and drought.

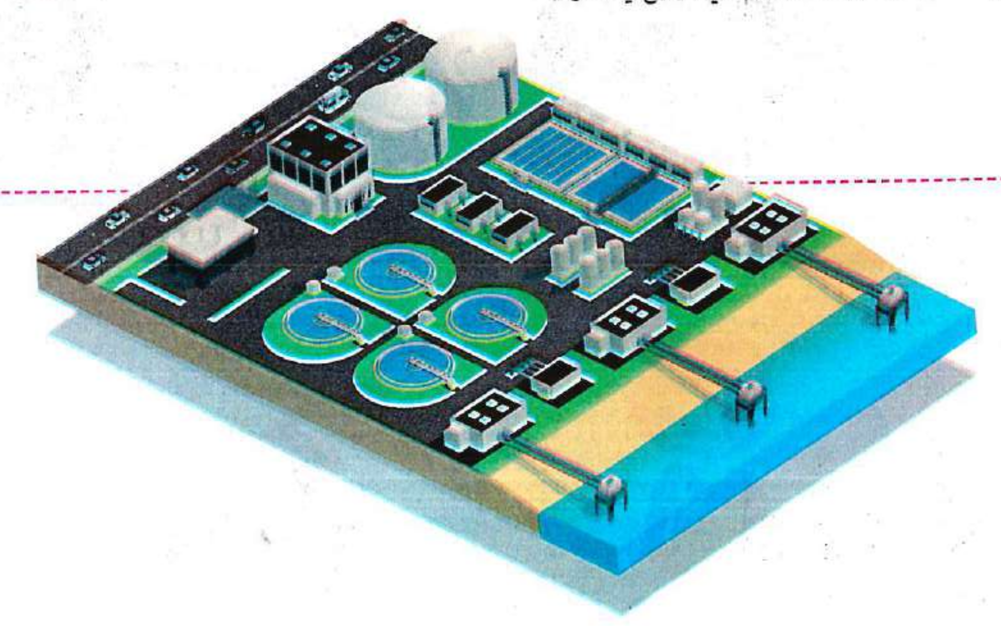
• هناك العديد من المشكلات التي تُهدِّد مصادر المياه العذبة على كوكب الأرض، مثل: التلوث والجفاف.

Unit 3

Recycling of Wastewater

- Recycling of wastewater is one of the solutions to conserve freshwater resources.
  - Water that we use for washing and showering can be filtered and cleaned, then used again for other purposes.
  - The Bahr Al-Baqar wastewater treatment plant in Egypt is one of the largest water treatment plants in the world.
  - Water treated there can be used to irrigate farms in Egypt.

- يعتبر إعادة تدوير مياه الصرف الصحي من إحدى الحلول للحفاظ على المياه العذبة.
- المياه التي نستخدمها للغسيل والاستحمام يمكن تنقيتها؛ ومِنْ ثَمَّ استخدامها مرة أخرى لأغراض أخرى.
- تعتبر محطة بحر البقر لمعالجة مياه الصرف الصحي في مصر من أكبر محطات معالجة المياه في العالم.
- المياه المعالجة يمكن استخدامها لري المزارع في مصر.

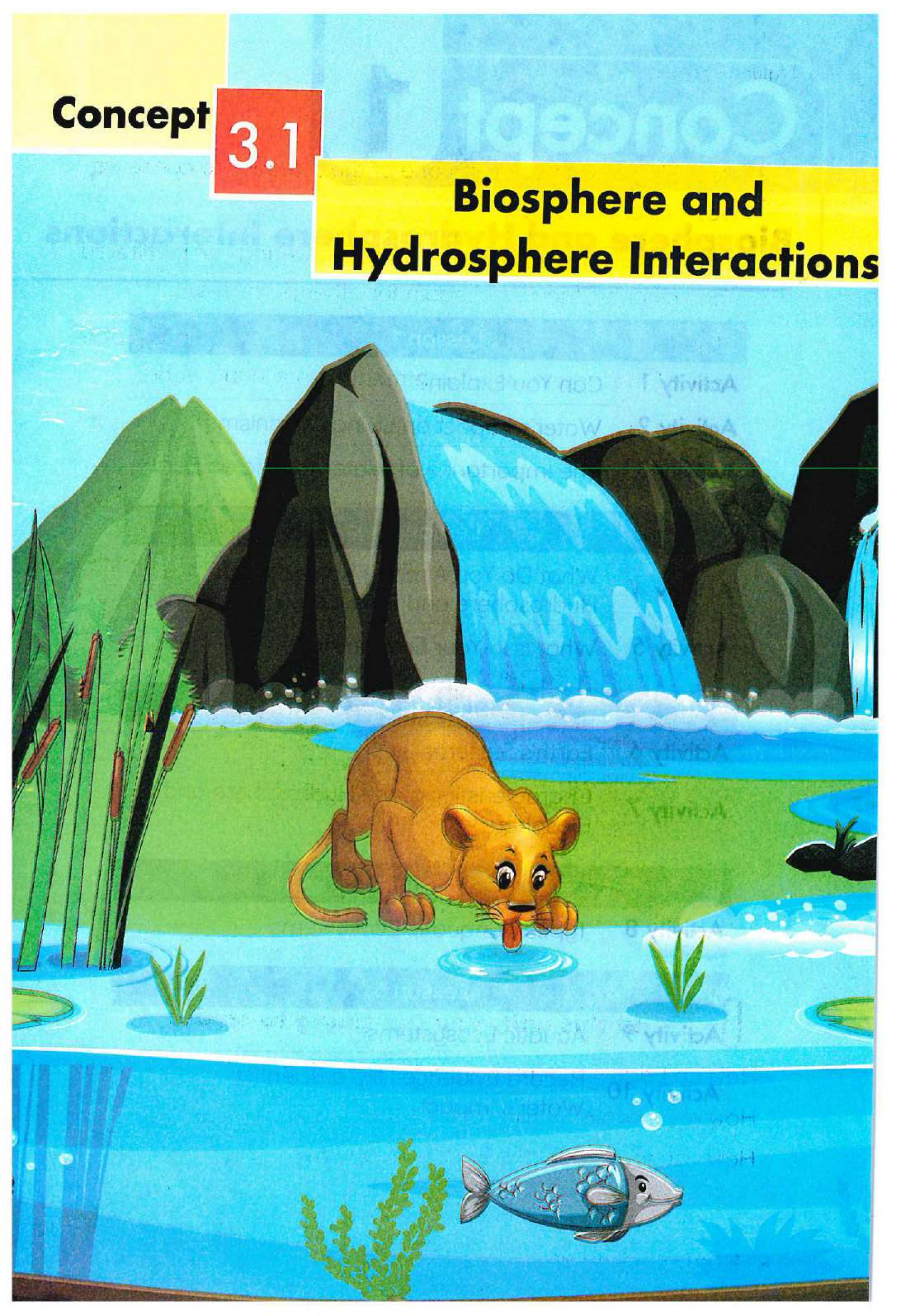


In this unit, you are going to study:

- How do Earth's spheres interact with each other?
- How much water is found on Earth?
- How can we protect the Earth's resources?

Concept 3.1

Biosphere and Hydrosphere Interactions



Concept 1

Biosphere and Hydrosphere Interactions

Lesson 1	
Activity 1	Can You Explain?
Activity 2	Water's Impact on Living Organisms
Activity 3	The Importance of Water for Life on Earth

Lesson 2	
Activity 4	What Do You Already Know About Hydrosphere and Biosphere Interactions?
Activity 5	What Is in Your Environment?

Lesson 3	
Activity 6	Earth's Systems
Activity 7	Characteristics of the Hydrosphere and Biosphere

Lesson 4	
Activity 8	Types of Aquatic Ecosystems

Lesson 5	
Activity 9	Aquatic Ecosystems
Activity 10	Record Evidence Like a Scientist: Water's Impact

Glossary

Concept (3.1)

Lesson (1)

Complex	مُعقد	Interact	تتفاعل	Ground water	مياه جوفية
Biosphere	الغلاف الحيوي	Hydrosphere	الغلاف المائي	Freezing	عملية التجمد
Geosphere	الغلاف الأرضي	Atmosphere	الغلاف الجوي	Recycle	يعيد تدوير
Metals	معادن	Molten rocks	صخور منصهرة	Recreation	الترفيه
Salt water	مياه مالحة	Fresh Water	مياه عذبة	Lakes	بحيرات
Three-quarters	ثلاثة أرباع	Mixture	خليط	Evaporation	عملية التبخير
Weathering	التجوية	Erosion	التعرية	Bathing	الاستحمام
Ocean	محيط	Seas	بحر	Manufacturing	تصنيع

Lesson (2)

Altitude	الارتفاع	Porous rocks	الصخور المسامية	Clouds	سُحُب
Definite channel	قناة محددة	Water cycle	دورة الماء	Renewable resource	مصدر متجدد

Lesson (3)

Sphere	غِلاف	Ground water	المياه الجوفية	Biome	المناطق الإحيائية
Glaciers	الأنهار الجليدية	Nutrients	عناصر غذائية	Gulfs	خلجان
Photosynthesis	البناء الضوئي	Wetland	الأراضي الرطبة	Rainforests	غابات ممطرة

Lesson (4)

Shallow areas	مياه ضحلة	Deep areas	مناطق عميقة	High tide	المد
Coral reefs	شعاب مَرجانية	Intertidal zones	مناطق المد والجزر	Concentration	تركيز
Coast	ساحل	Bacteria	بكتيريا	Low tide	الجُزر
Abyssal zones	المناطق السحيقة				

Lesson (5)

Still water	مياه ساكنة	Flowing water	مياه متحركة	Kelp	عشب البحر
Salamanders	السلمندر	Crayfish	جراد البحر	Flounder fish	سمك مفلطح
Water lily	زنبق الماء	Starfish	نجم البحر	Moses fish	سمك موسى
Catfish	سمك السلور				

Lesson 1

Activity 1 Can You Explain?

» The Earth is a complex system that consists of living organisms and nonliving things that interact with each other.

Scientists divided the Earth into four main systems (spheres).

Biosphere

It's the system that includes all living organisms, such as:

- Humans
- Animals
- Plants

Hydrosphere

It's the system that includes all water on the Earth, such as.

- Fresh water
- Salt water

Geosphere

It's the system that includes:

- Rocks
- Soil
- Sand

Atmosphere

It's the system that surrounds the Earth, and it is composed of a mixture of different gases, such as:

- Oxygen
- Nitrogen
- Carbon dioxide
- Water vapor

• الأرض عبارة عن نظام مُعقَّد يتكوَّن من كائنات حية وأشياء غير حية تتفاعل مع بعضها البعض.

• قام العلماء بتقسيم الأنظمة الرئيسية للأرض إلى ٤ أقسام (أغلفة) رئيسية:

– **الغلاف الحيوي:** هو النظام الذي يشمل جميع الكائنات الحية، مثل: الإنسان والحيوان والنبات.

– **الغلاف المائي:** هو النظام الذي يشمل جميع المياه على سطح الأرض، مثل: المياه العذبة والمياه المالحة.

– **الغلاف الأرضي:** هو النظام الذي يشمل الصخور والتربة والرمال.

– **الغلاف الجوي:** هو الغلاف المحيط بالأرض، ويتكوَّن من خليط من الغازات: (الأكسجين - النيتروجين - ثاني أكسيد الكربون - بخار الماء).

Concept 1

Activity 2 Water's Impact on Living Organisms

1 How do living organisms use water?

» All living organisms need water to grow, and survive.

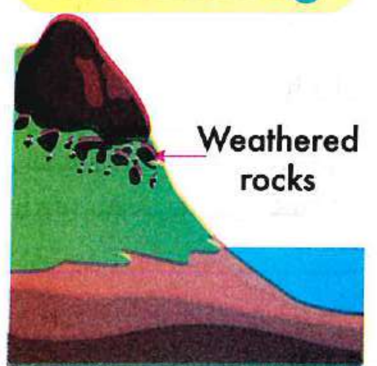




2 How does water affect nonliving things?

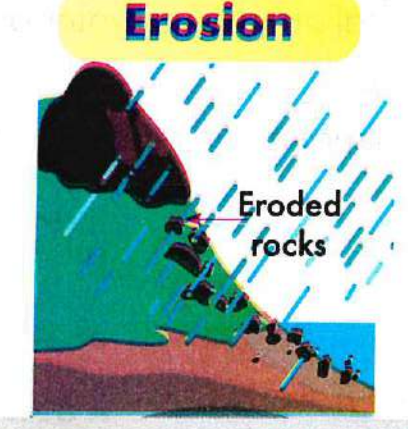
» Water causes weathering and erosion of rocks of the Earth's surface.

Weathering



then

Erosion



It is the process of breaking down of rocks into smaller particles by rain, wind, or temperature.

التجوية: هي عملية تكسير وتفتيت الصخور إلى قِطَع صغيرة عن طريق الأمطار أو الرياح أو درجات الحرارة.

It is the process of the transportation of small particles of rocks from a place to another by water or wind.

التعرية: هي عملية نقل الصخور الصغيرة من مكان لآخر بواسطة المياه والرياح.

Evaluate your learning!

» **Put (✓) or (✗):**

1. Plants can survive without water. ( )
2. The process of the transportation of weathered rocks from place to place is called weathering. ( )

Activity 3 The Importance of Water for Life on Earth

» Water is found everywhere on Earth, where it is found in lakes, rivers, seas, oceans, and groundwater.

- Earth looks like a blue marble from space. GR
  Because about three-quarters (71%) of the Earth is covered by water.



• يشبه كوكب الأرض الكرة الزرقاء عند النظر إليه من الفضاء.
• ما يقرب من ثلاثة أرباع الأرض (٧١٪) مغطى بالمياه.

The Amount of Water on Earth

- The total amount of water on Earth does not change, even if its state changes.
- We cannot make new water, but we can recycle it.

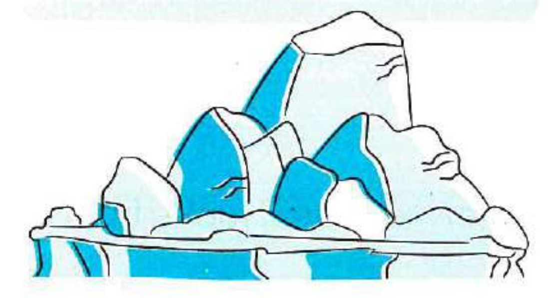
• لا تتغير الكمية الإجمالية للماء على سطح الأرض حتى لو تغيرت حالته من صورة لأخرى.
• لا يمكننا توفير مياه جديدة، ولكن يمكننا إعادة تدوير المياه.

Water in water bodies on Earth can change from liquid state into

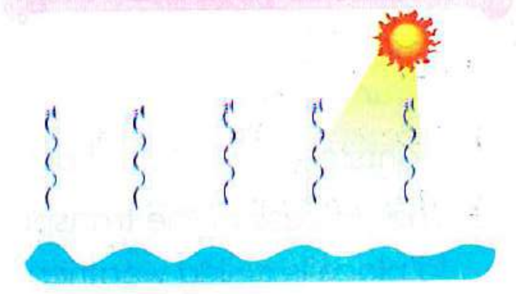




solid state (ice)
by freezing in extreme cold weather.



Gas state (Water vapor)
by evaporation in extreme hot weather.



Importance of Water

1. Humans and animals drink water to survive.





2. Plants need water to make photosynthesis





3. Some animals and plants live in water.





Evaluate your learning!

Put (✓) or (✗):

1. Nearly $\frac{3}{4}$ of the Earth is covered by water. (   )
2. The amount of water on Earth decreases when the water evaporates from different water bodies. (   )

Exercises on Lesson 1

Q1. Choose the correct answer:

1. Which of the following is a part of the biosphere? (Cairo 2023, Alex. 2024)
   a. Ice   b. Clouds   c. Water   d. Animals
2. .... is/are a part of the hydrosphere. (Cairo 2024)
   a. Rocks   b. Air   c. Water   d. Plants
3. The Earth's system that includes all living organisms is called the ....
   a. hydrosphere   b. biosphere   c. geosphere   d. atmosphere
4. Which of the following is/are a part of geosphere? (Qaliobia 2024)
   a. Rocks   b. Clouds   c. Water   d. Animals
5. Rocks are broken down into smaller particles during the .... process. (Qalioubia 2024)
   a. photosynthesis   b. weathering
   c. erosion   d. respiration
6. All the following are parts of the Earth's atmosphere, except ....
   a. oxygen   b. nitrogen   c. water   d. water vapor
7. Water covers nearly .... of the Earth's surface. (Minia 2023)
   a. $\frac{1}{2}$ b. $\frac{3}{4}$ c. $\frac{1}{5}$ d. $\frac{1}{4}$
8. When water of an ocean ...., it changes into ....
   a. freezes - water vapor   b. evaporates - ice
   c. freezes - ice   d. melts - water vapor
9. .... is a part of the Earth's .... that is responsible for weathering and erosion of rocks.
   a. Rainwater - atmosphere   b. Wind - hydrosphere
   c. Rainwater - hydrosphere   d. Wind - biosphere
10. Water is used in all the following purposes, except .... (Cairo 2024)
    a. recreation   b. burning   c. bathing   d. manufacturing

Q2. Put (✓) or (✗):

1. The Earth's systems are divided into three systems: the atmosphere, biosphere, and hydrosphere. (Behira2024) (   )
2. The system that includes rocks and soil is called the hydrosphere. (Alex. 2023) (   )
3. The total amount of water on the Earth always changes. (   )
4. We cannot create new water, so we need to recycle it. (   )
5. Water evaporates in extreme cold weather. (   )
6. Water is important for the growth of the living organisms. (Luxor 2023) (   )
7. Some animals and plants live in the hydrosphere. (Cairo 2024) (   )

Q3. Correct the underlined word:

1. The Earth looks like a green marble from space. (....................)
2. Water covers about two quarters of the planet Earth. (....................)
3. The oxygen in the air is a part of the geosphere. (....................)
4. When water freezes, it changes into water vapor. (....................)

Q4. Write the scientific term:

1. It is one of the Earth's systems that includes the gases surrounding the Earth. (....................)
2. It is the system that includes humans, animals, and plants on Earth. (....................)
3. It is the system in which rocks, sand, and soil are parts of it. (....................)
4. It is the system that includes all water on the Earth. (....................)
5. It is the process in which water of oceans changes into ice in extreme cold weather. (....................)
6. It is the process in which water of oceans changes into water vapor in extreme hot weather. (....................)
7. It is the process of the transportation of small, broken rocks from one place to another by wind or water. (....................)
8. It is the process of breaking down of rocks into smaller particles by rain, water, or temperature. (....................)

Q5. Complete the following sentences:

1. Rocks and mountains are from the Earth's .... system. (Sharkia 2024)
2. Water changes from a liquid state into a .... state in extreme cold weather.
3. .... system includes all living organisms on Earth. (Giza 2024)
4. The transportation of small particles of rocks from a place to another on Earth's surface is called the .... process.
5. Water of a lake changes from .... state to .... state by evaporation.
6. Water can affect nonliving things, such as .... of the Earth's surface by .... and erosion processes.

Q6. Cross out the odd word:

1. Hydrosphere – Biosphere – Atmosphere – Erosion (..................)
2. Nitrogen – Sand – Oxygen – Carbon dioxide (Dakahlia 2024) (..................)

Q7. Choose from column (A) what suits it in column (B): (Alex. 2024)

Column (A)	Column (B)
1 Atmosphere	a. contains animals and plants.
2 Hydrosphere	b. contains rocks and sands.
3 Biosphere	c. is a mixture of gases that surrounds the Earth.
4 Geosphere	d. includes both fresh water and salt water on Earth.

1 .... 2 .... 3 .... 4 ....

Q8. Give reasons for:

1. The Earth looks like a blue marble from space.

....

2. Water affects nonliving things like rocks on the Earth's surface.

....

3. Water is important for all plants on Earth. (Giza 2023)

....

Q9. What happens to:

1. The water of a lake when the weather gets extremely hot?

....

2. The biosphere when there's no hydrosphere on the Earth?

....

Q10. Study the following figure, then answer the questions below:



1. The part number (......) is included in the Earth's hydrosphere.
2. The component number (......) is a part of the geosphere.
3. The component number (......) is a part of the atmosphere.
4. The component number (......) is a part of the biosphere.
5. What happens to component number (4) when the weather becomes extremely cold?

....

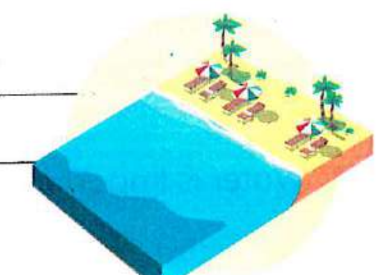
....

Lesson 2

Activity 4 What Do You Already Know About Hydrosphere and Biosphere Interactions?

Water bodies on Earth have different forms, such as:

1 Oceans and seas:



Type of Water: Salt water

- They are very large water bodies.

• المحيطات والبحار: هي مسطحات مائية هائلة.

2 Lakes:

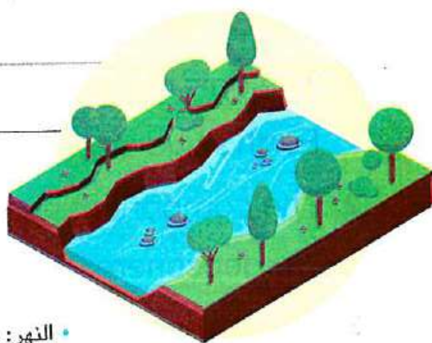


Type of Water:
- Most lakes contain fresh water.
- Some lakes contain salt water.

- Lake is a water body that is surrounded by land.

• البحيرة: هي مسطح مائي مُحاط باليابسة من جميع الجهات.

3 Rivers:



Type of Water: Fresh water

- They are water bodies that always flow from an area of high altitude (place) to an area of low altitude (place) in a definite path.

• النهر: هو الماء الذي يتدفق من منطقة عالية الارتفاع إلى منطقة منخفضة الارتفاع في قناة محددة.

4 Groundwater:

Type of Water: Fresh water

- It is the water that lies beneath (under) the Earth's surface due to leakage of water into Earth through a layer of porous rocks.

• المياه الجوفية: هي المياه التي تقع تحت سطح الأرض نتيجة تسرب المياه من خلال طبقة الصخور المسامية.

Renewable Resources:

- They are natural resources that can be replaced.

Renewable Resources





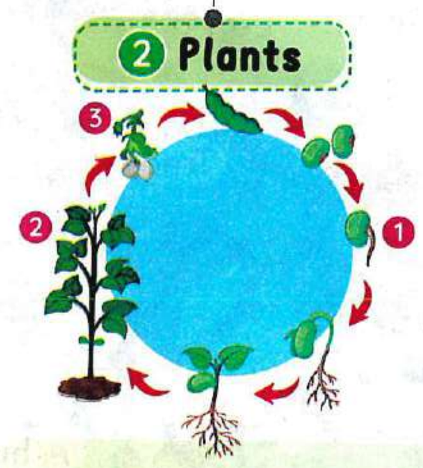
Water can be replaced in nature during the water cycle, where:

1. Water found in water bodies on Earth evaporates by the Sun.
2. Water vapor collects (condenses) in the air, forming clouds.
3. Water returns back to the Earth's surface in the form of rain

- يعاد تجديد الماء في الطبيعة خلال دورة الماء حيث:

1. يتبخر الماء من المسطحات المائية بفعل الشمس.
2. يتكثف بخار الماء مُكوِّنًا السحب.
3. يعود الماء لسطح الأرض على هيئة مطر.

2 Plants



- Plants can be planted from seeds that grow up forming new plants.
- plants need water to grow and survive.
- Plants are affected if the amount of water decreases or it gets polluted.

- يمكن زراعة النباتات من خلال البذور التي تنمو مُكوِّنة نباتات جديدة.
- تحتاج النباتات إلى الماء للنمو والبقاء على قيد الحياة.
- تتأثر النباتات عندما تقل كمية الماء أو يصبح ملوثًا.



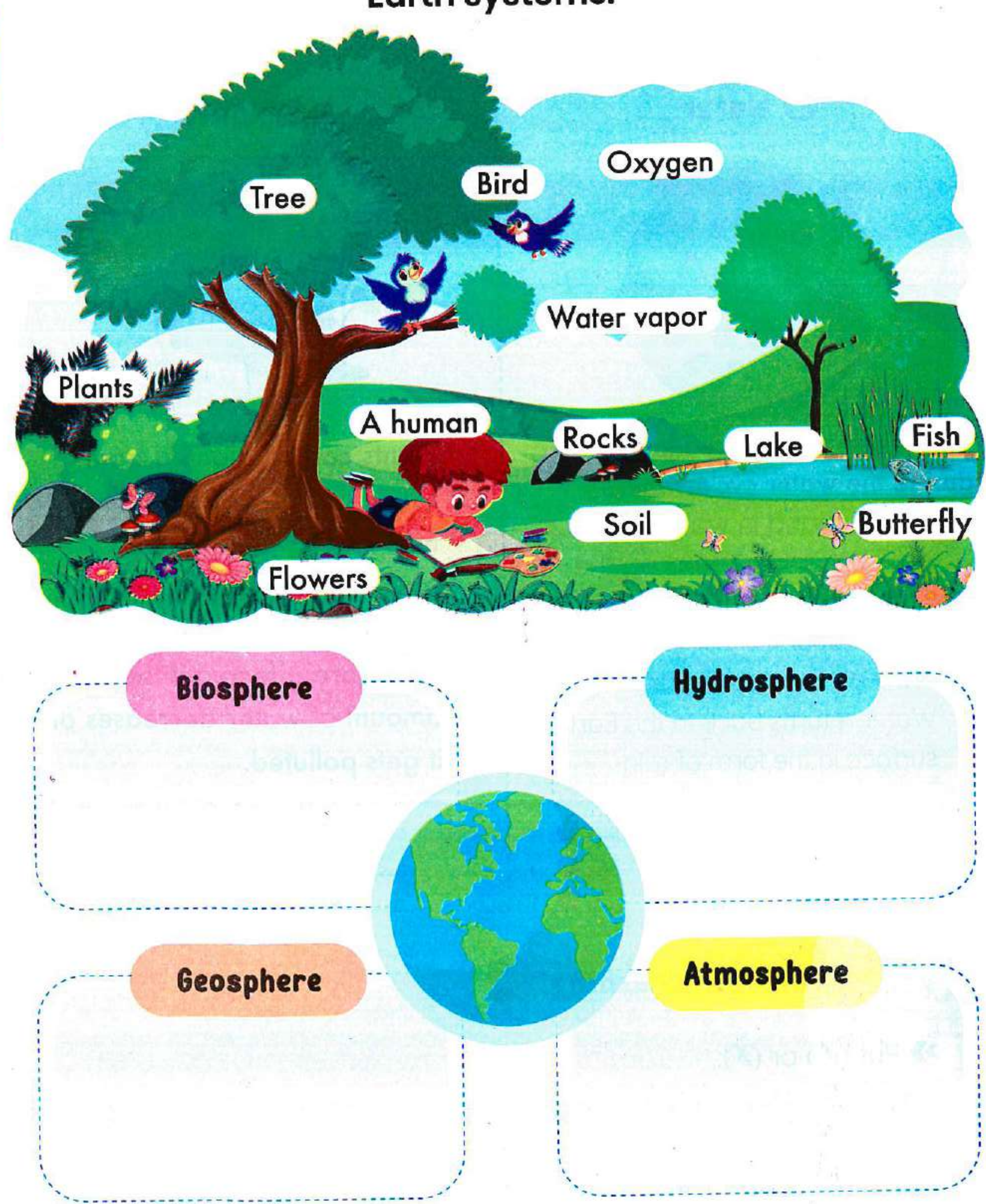
Evaluate your learning!

Put (✓) or (✗):

1. Rivers always contain fresh water. ( )
2. A lake is land surrounded by water. ( )

Activity 5 What Is in Your Environment?

Classify the given items in the following figure into four Earth systems.



Exercises on Lesson 2

Q1. Choose the correct answer:

1. Which of the following is found between porous of rocks below the Earth's surface? (Cairo 2023)
   a. Ice b. Groundwater
   c. Oceans d. Water vapour

2. .... and .... contain salty water.
   a. Lakes - rivers b. Seas - oceans
   c. Oceans - groundwater d. Rivers – oceans

3. Water and plants are similar in being ....
   a. parts of the biosphere b. parts of the hydrosphere
   c. renewable resources d. nonrenewable resources

4. The oxygen we breathe is a part of the Earth's ....
   a. hydrosphere b. biosphere c. atmosphere d. geosphere

5. Rainwater is a part of the .... (Dakahlia 2024)
   a. biosphere b. atmosphere
   c. geosphere d. hydrosphere

6. Falling of a small tree due to blowing of strong winds is an example of an interaction between the .... and .... (Minia 2023)
   a. biosphere - hydrosphere b. geosphere - atmosphere
   c. hydrosphere - geosphere d. biosphere - atmosphere

7. When a river erodes rocks and soil, creating a canyon, this is an example of an interaction between the .... and ....
   a. biosphere - atmosphere b. biosphere - hydrosphere
   c. hydrosphere - geosphere d. geosphere - atmosphere

8. When oxygen in air causes rusting of some rocks, this is an example of an interaction between the .... and ....
   a. biosphere - atmosphere b. biosphere - hydrosphere
   c. hydrosphere - geosphere d. geosphere - atmosphere

9 The weathering of rocks by water represents an interaction between the .... and ....

a. biosphere – hydrosphere
b. hydrosphere – geosphere
c. hydrosphere – atmosphere
d. atmosphere – geosphere

10 The presence of sharks in oceans represents an interaction between the .... and .... (Alex. 2024)

a. geosphere - biosphere
b. atmosphere - hydrosphere
c. hydrosphere - biosphere
d. geosphere - atmosphere

11 When water of a river evaporates, it will transfer from the .... to ....

a. hydrosphere - biosphere
b. hydrosphere - atmosphere
c. atmosphere - hydrosphere
d. geosphere - hydrosphere

12 Water evaporation and its condensation on Earth show an interaction between the .... and .... (Alex. 2023)

a. atmosphere – hydrosphere
b. hydrosphere – biosphere
c. biosphere – geosphere
d. biosphere – atmosphere

13 An area of land where water flows in a specific path from a higher altitude area to a lower altitude area is called a/an ....

a. river
b. sea
c. lake
d. ocean

Q2. Put (✓) or (✗):

1 There's no interaction between the hydrosphere and atmosphere when water present in water bodies evaporates. ( )

2 The water percentage on earth is constant due to the water cycle. ( )

3 Some of the lakes contain fresh water, while most of the lakes contain salt water. ( )

4 Oceans are small water bodies that contain salty water. ( )

5 Plants depend on the hydrosphere of Earth to grow and survive. ( )

6 Groundwater found in porous rocks is part of the geosphere. ( )

7 Weathering of rocks as a result of the effect of rains indicates an interaction between hydrosphere and biosphere. (Dakahlia 2023) (   )

8 A river flows from an area of lower place to an area with higher places. (Alex. 2024) (   )

9 There's an interaction between Earth's biosphere and atmosphere during respiration of humans and animals. (   )

Q3. Correct the underlined words:

1 Seas and oceans always contain fresh water. (....................)

2 Wind is considered part of the geosphere. (....................)

3 During the water cycle in nature, water evaporates into water vapor, forming rains. (Cairo 2024) (....................)

4 The type of water in rivers is salty water. (Giza 2024) (....................)

5 A rat that digs a burrow in the soil represents interaction between biosphere and hydrosphere. (Giza 2024) (....................)

Q4. Write the scientific term:

1 It is a water body that surrounded by land. (Cairo 2023) (....................)

2 It is a very large water body that always contains salt water. (....................)

3 It is a water body that flows from an area of higher altitude to an area of lower altitude. (....................)

4 It is a part of the hydrosphere that is found below the Earth's surface between rocks. (....................)

5 They are natural resources that can be replaced. (....................)

6 It is a cycle that shows the movement of water on the Earth. (....................)

Q5. Complete the following sentences:

1 .... are large water bodies surrounded by land. (Alex. 2024)

2 Most lakes and groundwater contain .... water, while seas and some lakes contain .... water .

3. Water run across the land is an example of an interaction between .... and geosphere. (Port Said 2024)
4. Water is renewed in nature through .... (Qaliobia 2024)
5. During the water cycle, water found in water bodies .... , then it goes to the atmosphere, forming ....
6. When the amount of water decreases or it gets polluted, plants which are a part of Earth's .... will be affected.
7. Groundwater is the water that leaked into the Earth through a porous layer of .... which are parts of the Earth's ....
8. Irrigation of plants is an example of the interaction between two of Earth's systems which are .... and .... (Cairo 2023)

Q6. Cross out the odd word:

1. Oceans – Seas – Rivers – Rocks (........................)
2. Wind – Rain – Oxygen – Carbon dioxide (........................)
3. Tree – Birds – Girl – Rocks (Cairo 2024) (........................)

Q7. Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Lakes	a. always contain salt water.
2 Oceans	b. some of them contain salt water and the most of them contain fresh water.
3 Groundwater	c. flow from an area of higher place to an area with lower places in a definite path.
4 Rivers	d. is the water that lies under the Earth's surface.

1 .... 2 .... 3 .... 4 ....

Q8. Give reasons for:

1. Hiding of worms inside the soil is an example of an interaction between two of Earth's spheres. (Alex. 2023)

   ....

2. Pulling sand on beaches by sea waves represents an interaction between two of Earth's systems.

   ....

3. Plants are renewable resources on the Earth.

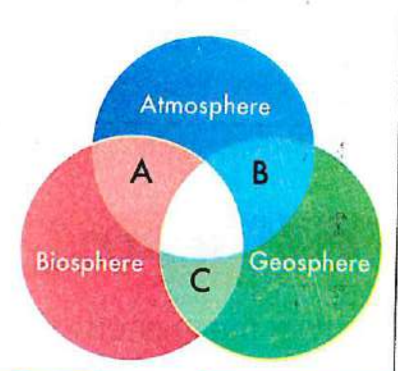
   ....

4. Water is a renewable resource on the Earth.

   ....

Q9. Study the following figure, then answer the questions below:

Put (✓) in front of the area that shows an interaction between the Earth's spheres:



	Area "A"	Area "B"	Area "C"
1 Oxygen gas reacts with iron found in a rock.			
2 Wind blows the seeds of a plant through air.			
3 Roots of an acacia grow deeply in the soil to reach water.			
4 A giraffe breathes in oxygen gas.			
5 Wind moves small broken rocks from a place to another.			

Lesson 3

Activity 6 Earth's Systems

» Put (✓) or (✗):

1. There's no interaction between Earth's systems. ( )
2. Oceans and rivers are components of the Earth's hydrosphere. ( )

Scientists named each of the four Earth systems using the word "sphere". → Because the shape of the Earth is very close to a sphere. (Earth is not a perfect sphere.)



Now, we are going to learn more about the four Earth systems.

1 Geosphere:

- It is the system that includes rocks, sand, soil, and minerals.

Note:

- Geosphere is also known as "lithosphere".

The word "Geo" means "Earth".

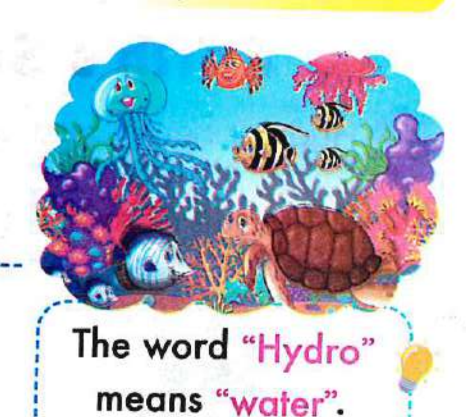
It includes:

- Rocks, sand, and soil on the Earth.
- Molten rocks and minerals inside the Earth.
- Landforms (mountains – canyons – valleys – dunes).



2 Hydrosphere:

- It is the system that includes all of the water on, under, and above the Earth.



It includes:

- Oceans
- Seas
- Rivers
- Groundwater
- Glaciers
- Lakes

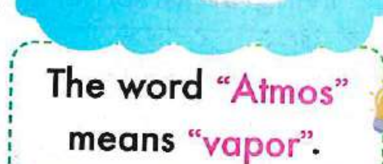
The word "Hydro" means "water".

Note:

- Glaciers are made of ice, "frozen water," which are a part of the hydrosphere.

3 Atmosphere:

- It is the system that includes all the gases that surround the Earth.



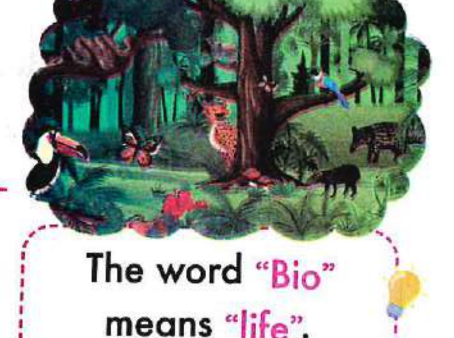
It includes:

- Oxygen gas
- Carbon dioxide gas
- Water vapor
- Nitrogen gas

The word "Atmos" means "vapor".

4 Biosphere:

- It is the system that includes all living organisms on the Earth.



It includes:

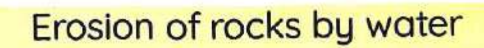
- Humans
- Animals
- Plants
- Birds
- Fish
- Insects
- Microorganisms

The word "Bio" means "life".

Glaciers	أنهار جليدية	Seas	البحار	Oceans	المحيطات

Earth's Systems Interactions

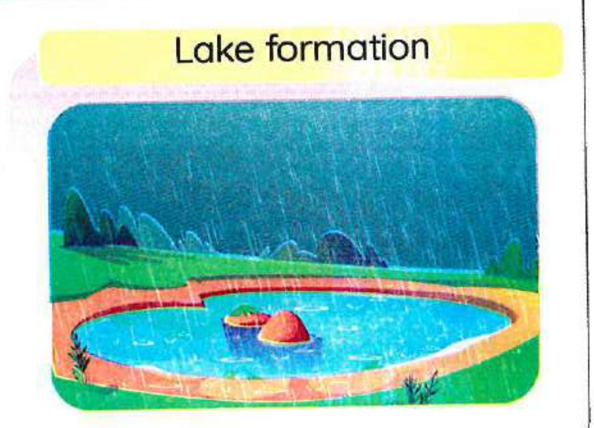
1 Hydrosphere interacts with geosphere:



Erosion of rocks by water

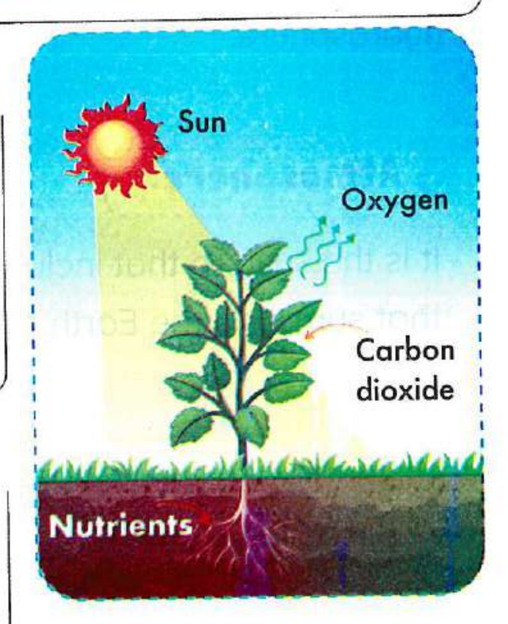


Lake formation



2 Atmosphere interacts with biosphere:

- During the photosynthesis process, plants take in **carbon dioxide** from the air and release **oxygen gas**. that is used in the respiration of all living organisms.



3 Geosphere interacts with biosphere:

- During the photosynthesis process, plants roots absorb **nutrients** from the soil for making their food.



Evaluate your learning!

» Put (✓) or (✗):

1. Glaciers are a part of the geosphere. ( )
2. When the fennec fox stays in a burrow, this is an interaction between the geosphere and the biosphere. ( )

Interaction	تفاعل	Photosynthesis	البناء الضوئي	Soil	تربة
Erosion	عملية التعرية	Release	ينتج	Nutrients	عناصر غذائية

Concept 1

Activity 7 Characteristics of the Hydrosphere and Biosphere



1 Some characteristics of the biosphere:



- Living organisms can exist everywhere on the Earth.

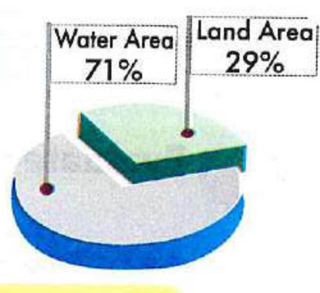


Biome

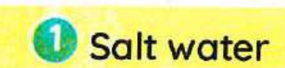
It is a large area of the world that has similar soil, climate, animals, and plants (wildlife).

- Examples of biomes:
  - Deserts
  - Forests
  - Rainforests
  - Grasslands
  - Wetlands

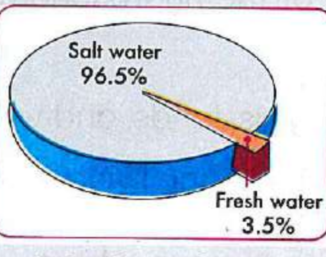
2 Some characteristics of the hydrosphere:



- The hydrosphere contains all the liquid, solid, and gaseous water on the Earth planet.
- About 71% of Earth is covered by water.



	① Salt water	② Fresh water
Ratio	• It forms about **96.5%** of water on the Earth.	• It forms about 3.5% of water on the Earth.
It is found in	• Oceans • Seas • Gulfs (Bays) • Some lakes	• Rivers • Rainwater • Groundwater • Most lakes



Note:

- Most of the fresh water on the Earth is not liquid running water, but it is found in the form of frozen water as large pieces of ice called glaciers.

Interaction between the hydrosphere and biosphere

1. Humans and animals drink water to survive.



2. Plants need water to grow.



3. Water is the habitat of many living organisms, such as fish.

NOTE:

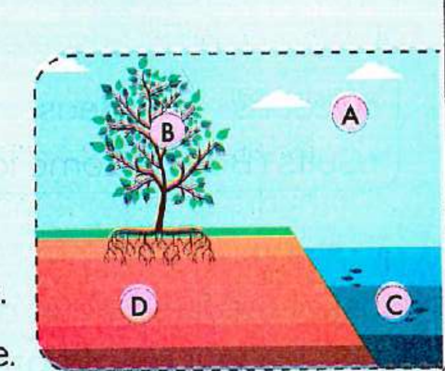
- Humans are part of the biosphere that can affect all of the Earth's systems.
- الإنسان جزء من الغلاف الحيوي، ويمكن أن يؤثر في كل أنظمة الأرض.

Evaluate your learning!

Put (✓) or (✗):

1. Most of the Earth is covered with fresh water. ( )
2. Humans are a part of the hydrosphere that affects other Earth's systems. ( )
3. Deserts, rainforests, grasslands, and wetlands are biomes. ( )
4. Water is the habitat for many living organisms. ( )

Study the opposite figure, then complete the sentences below:



1. Letter (..........) represents the geosphere.
2. Letter (..........) represents the biosphere.
3. Letter (..........) represents the atmosphere.
4. Letter (..........) represents the hydrosphere.

Exercises on Lesson 3

Q1. Choose the correct answer:

1. Hydrosphere includes all the following items, except .... (Cairo 2024)
   a. oceans b. rivers c. molten rocks d. groundwater
2. Mountains and valleys are parts of the .... (Damietta, Giza 2024)
   a. biosphere b. atmosphere c. geosphere d. hydrosphere
3. All of the following belong to geosphere, except .... (Sharkia 2024)
   a. minerals b. rocks c. helium d. soil
4. Formation of lakes is an example of an interaction between the .... and .... (Kafr El-Sheikh 2023)
   a. biosphere - hydrosphere b. geosphere – atmosphere
   c. atmosphere - biosphere d. hydrosphere - geosphere
5. When wind blows seeds of plant, there's an interaction between the biosphere and .... (Sharkia 2024)
   a. hydrosphere b. lithosphere c. atmosphere d. geosphere
6. Which of the following isn't considered an interaction between the hydrosphere and biosphere?
   a. Irrigation of plants b. A fox living on a glacier
   c. Hiding of a rabbit in a burrow d. A dolphin living in an ocean
7. Which Earth system isn't involved during the erosion of coastal rocks by sea waves and wind?
   a. Hydrosphere b. Biosphere c. Geosphere d. Atmosphere
8. When a plant absorbs nutrients from the soil, there's an interaction between the .... and ....
   a. biosphere - hydrosphere b. hydrosphere - geosphere
   c. hydrosphere - atmosphere d. biosphere – geosphere
9. The amount of the salt water is .... the amount of fresh water on Earth. (Alex. 2024)
   a. smaller than b. greater than c. equal to d. half

10 About 96.5% of Earth's water is .... (Qaliobia 2023)

a. fresh water b. warm water c. salt water d. frozen water

11 All the following water bodies don't contain fresh water, except ....

a. gulfs b. oceans c. seas d. glaciers

12 Most of fresh water on Earth is found in the form of .... (Dakhlia. 2023)

a. groundwater b. rivers c. glacier d. streams

Q2. Put (✓) or (✗):

1 Earth's systems don't interact with each other. (Cairo 2024) (   )

2 Lakes, oceans, and rivers are included in the hydrosphere. (Qaliobia 2024) (   )

3 Gases which surround the Earth represent the atmosphere. (Alex. 2023) (   )

4 Both grasslands and wetlands are examples of biomes. (   )

5 Plants get carbon dioxide gas from the geosphere to make their own food. (   )

6 Formation of a lake is an example of an interaction between hydrosphere and geosphere. (   )

7 Living of aquatic organisms in the sea represents an interaction between biosphere and hydrosphere. (   )

8 Photosynthesis results from interaction between biosphere and atmosphere only. (Dakahlia 2024) (   )

9 Salt water represents 96.5 % of water on Earth. (Giza 2024) (   )

10 Fresh water forms about 3.5% of the water on Earth. (Cairo 2023) (   )

11 The frozen water on Earth is a part of the geosphere. (Giza 2024) (   )

12 Living organisms need geosphere to survive. (   )

13 Most of the fresh water on Earth is found in liquid running water. (Qaliobia 2024) (   )

14 Without the hydrosphere, life on Earth will disappear. (   )

Q3. Correct the underlined word:

1. Nitrogen and oxygen gases make up most of the Earth's <u>hydrosphere</u>. (........................)
2. Nearly 70% of Earth is occupied by <u>land</u>. (........................)
3. The frozen water on Earth is a part of <u>geosphere</u>. (Gharbia 2024) (........................)
4. <u>Fresh</u> water represents 96.5 % of water on Earth. (Port Said 2024) (........................)
5. Most of the <u>salt</u> water on Earth exists in the form of frozen water. (........................)
6. Rivers and most of lakes contain <u>salt</u> water. (........................)

Q4. Write the scientific term:

1. A large area of the world that has similar soil, climate, plants and animals. (Alex. 2023) (........................)
2. It's the Earth's system that includes different landforms. (........................)
3. It's the Earth's system that includes the gases surrounding the Earth. (........................)
4. The Earth's system that includes all salt water and fresh water. (........................)
5. It is the type of water that forms about 96.5% of the Earth's hydrosphere. (........................)
6. It is the system that includes humans, animals, and plants on Earth. (Cairo 2023) (........................)

Q5. Complete the following sentences:

1. Most of fresh water on Earth is found in a form of frozen water called .... (Alex. 2024)
2. The amount of fresh water on Earth is .... than the amount of salt water. (Giza 2023)
3. A group of plants and animals which live together in a large area characterized by its climate is called .... (Dakahlia 2024)

4 When a frog respires oxygen, there's an interaction between .... and .... systems.

5 The percentage of salty water is about .... of the Earth's hydrosphere. (Sharkia 2024)

6 Rocks and mountains are from the Earth's .... system. (Sharkia 2024)

7 The amount of frozen fresh water is .... than the liquid fresh water on Earth. (Kafr El-Sheikh 2024)

8 96.5% of the earth's water is .... water. (Dakahlia 2024)

9 A spring flows out from a rock is an example of an interaction between .... and ....

Q6. Cross out the odd word:

1 Molten rocks – Rivers – Glaciers – Seas (..................)

2 Rivers – Rain water - Groundwater - Ocean (Qaliobia 2024) (..................)

3 Deserts – Grasslands – Rainforests – Photosynthesis (..................)

Q7. Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 The word "Geo" refers to	a. water.
2 The word "Hydro" refers to	b. Earth.
3 The word "Atmos" refers to	c. life.
4 The word "bio" refers to	d. vapor.

1 .... 2 .... 3 .... 4 ....

Q8. Give reasons for:

1. The Earth systems are called "spheres".

....

2. The formation of a lake is an example of an interaction between two of the Earth's spheres.

....

3. Most of the fresh water on the Earth can't be used for drinking.

....

4. Atmosphere is very important for plants. (Cairo 2024)

....

Q9. What happens if:

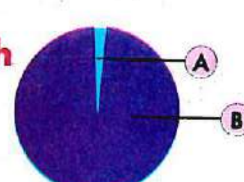
1. Plants can't get carbon dioxide gas from air? (Alex. 2024)

....

2. The hydrosphere is absent on the Earth's planet?

....

Q10. Study the following chart of salt water and fresh water distribution on Earth, then choose the correct answer:



1. The area (A) represents .... (fresh water – salt water)
2. A sea is part of the .... (area (A) – area (B))
3. Both areas (A) and (B) belong to the Earth's .... (geosphere – hydrosphere)
4. When a polar bear hunts a seal on ice, there's an interaction between area (B) and .... (atmosphere – biosphere)

Lesson 4

Activity 8 Types of Aquatic Ecosystems

Put (✓) or (✗):

1. The Earth's hydrosphere is divided into fresh water and salt water. (   )
2. The amount of fresh water on the Earth's surface is more than the amount of salt water. (   )

- There are many different types of aquatic ecosystems.
- In this activity, we are going to study the types of aquatic ecosystems.



1. Saltwater Ecosystems

Salt water ecosystems includes seas, oceans, and some lakes.

- Shallow areas
- Deepest areas

2. Freshwater Ecosystems

Freshwater ecosystems includes ponds, most lakes, rivers, and streams.

- Still water
- Flowing water

Shallow area	منطقة ضحلة	Still water	مياه ساكنة
Deep area	منطقة عميقة	Flowing water	مياه جارية

Concept 1

1 Saltwater Ecosystems

Shallow Areas

- These areas contain coral reefs and intertidal zones.

• Intertidal Zone

It is the area along the coast that disappears underwater at the high tide and appears at the low tide.

منطقة المد والجزر:

منطقة على طول الساحل تختفي تحت الماء عند ارتفاع المد وتظهر عند انخفاض المد.



Deepest Areas

- These areas are called abyssal zones.

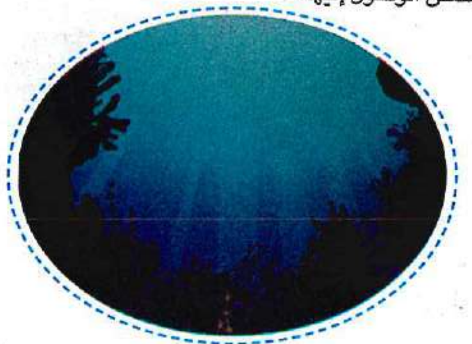
• Abyssal Zone



They are very deep areas in oceans, so sunlight cannot reach them.

المناطق السحيقة:

هي مناطق عميقة جدًا في المحيطات بحيث لا يمكن لأشعة الشمس الوصول إليها.



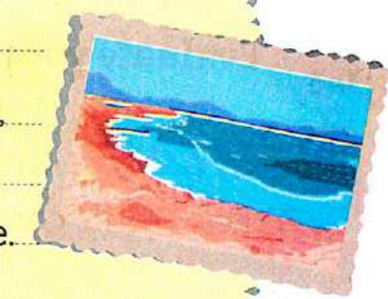
Salt Lakes:

Some lakes contain salt water, such as:

- Lake Bardawil in Egypt
- Lake Assal in Djibouti

Lake Assal

- It has a **high concentration** of natural salts so,
  - Fish (most aquatic animals) can't live in it.
  - Few plants (little vegetation) can grow there.
  - Many different types of bacteria live in it.



Unit 3

2 Fresh water Ecosystems

Still Water (Ponds and most lakes)

- In many ponds and lakes, fresh water is present all year.

• توجد المياه العذبة في العديد من البِرَك والبحيرات طوال العام.

Fresh Lake:

Lake Nasser in Egypt



Flowing Water (Streams and rivers)

- Water always moving in streams and rivers.
- Many different plants and animals live in flowing water bodies.

• الجداول عبارة عن مسطحات صغيرة من المياه المتدفقة.

• تزدهر النباتات وتنمو الحيوانات المختلفة في المياه الجارية.





NOTE:

- Some ponds and lakes dry up in the hot summer months, so plants and animals that live there must adapt to this change.

• قد تجف بعض البِرَك والبحيرات في أشهر الصيف الحارة؛ لذلك تتكيَّف النباتات والحيوانات على هذه التغيرات.

Evaluate your learning!

Put (✓) or (✗):

1. Few plants can grow in Lake Assal because it has fresh water. (   )
2. Lake Nasser contains freshwater. (   )

Exercises on Lesson 4

Q1. Choose the correct answer:

1. .... and .... are the largest saltwater ecosystems that cover large parts of the Earth's surface.
   a. Oceans - ponds
   b. Seas - rivers
   c. Oceans - seas
   d. Lakes - streams

2. Rivers and streams contain .... water, while ponds contain .... water. (Suez 2023)
   a. salt - fresh
   b. fresh - salt
   c. running - still
   d. still - running

3. An example of saltwater ecosystems is .... (Dakahlia 2024)
   a. Nile River
   b. Lake Assal
   c. a glacier
   d. Lake Nasser

4. Sunlight can't reach the .... in the ocean.
   a. shallow area
   b. intertidal zone
   c. abyssal zone
   d. high-tide area

5. Coral reefs are found in the .... of oceans.
   a. high-tide zone
   b. low-tide zone
   c. abyssal zone
   d. shallow area

6. Both ponds and streams have ....
   a. fresh running water
   b. salt running water
   c. fresh still water
   d. fresh water

7. Lake Assal is characterized by the presence of ....
   a. low concentration of salt
   b. bacteria
   c. many marine animals
   d. fresh water

8. All the following aquatic ecosystems contain salt water, except ....
   a. Lake Bardawil
   b. Red Sea
   c. Lake Assal
   d. Lake Nasser

9. Some .... and ponds may dry up in .... months.
   a. rivers - summer
   b. rivers - winter
   c. lakes - summer
   d. streams - winter

Q2. Put (✓) or (✗):

1. Shallow areas of the ocean contain coral reefs. ( )
2. Intertidal zones in the ocean disappear at low tides. ( )
3. An ocean has a shallow dark area called the abyssal zone. ( )
4. There are no organisms can survive in shallow areas of oceans. ( )
5. You can see the intertidal zone of an ocean during high tides. ( )
6. Some ponds and lakes may dry up in winter months. (Cairo 2023) ( )
7. Rivers and streams are running freshwater bodies. (Giza 2023) ( )
8. Both Lake Bardawil and Lake Assal contain salt running water. ( )
9. There are no plants that can grow in Lake Assal. ( )

Q3. Write the scientific term:

1. It is an area along the coast that disappears at the high tide and appears at the low tide. (Kafr El-Sheikh 2023) (..........)
2. They are areas of the oceans that contain coral reefs and intertidal zones. (..........)

Q4. Complete the following using the words between the brackets:

(Lake Nasser - Lake Bardawil - ponds - fresh water - abyssal zone - salt water - Intertidal zone)

1. Aquatic ecosystems can be classified into .... ecosystems and .... ecosystems
2. Both .... and .... are still fresh water bodies, while .... is a still salt water body.
3. .... is the area along the ocean that appears at low tide and disappears at high tide.
4. No plants can survive in the .... of the ocean as no sunlight can reach it.

Q5. Cross out the odd word:

1. Rivers – Streams – Oceans – Ponds (..........)
2. Nile River – Lake Naser – Lake Assal – Lake Bardawil (..........)
3. Red Sea – Lake Assal – Lake Nasser – Lake Bardawil (..........)

Q6. Give reasons for:

1. There's no plants that can live in the abyssal zone.

....

....

2. There's no fish that can live in Lake Assal.

....

....

3. Living organisms that live near some lakes may suffer during summer months.

....

....

Q7. What happens to:

1. Intertidal zones during high tides?

....

....

Q8. Study the following figure of an ocean, then put (✓) or (✗):

1. Area (A) is called the abyssal zone. ( )
2. Area (A) is disappears at low tides. ( )
3. Area (A) is darker than area (B). ( )
4. Coral reefs can grow in area (B). ( )
5. Area (B) doesn't receive any sunlight, so no plar ( )

A

B

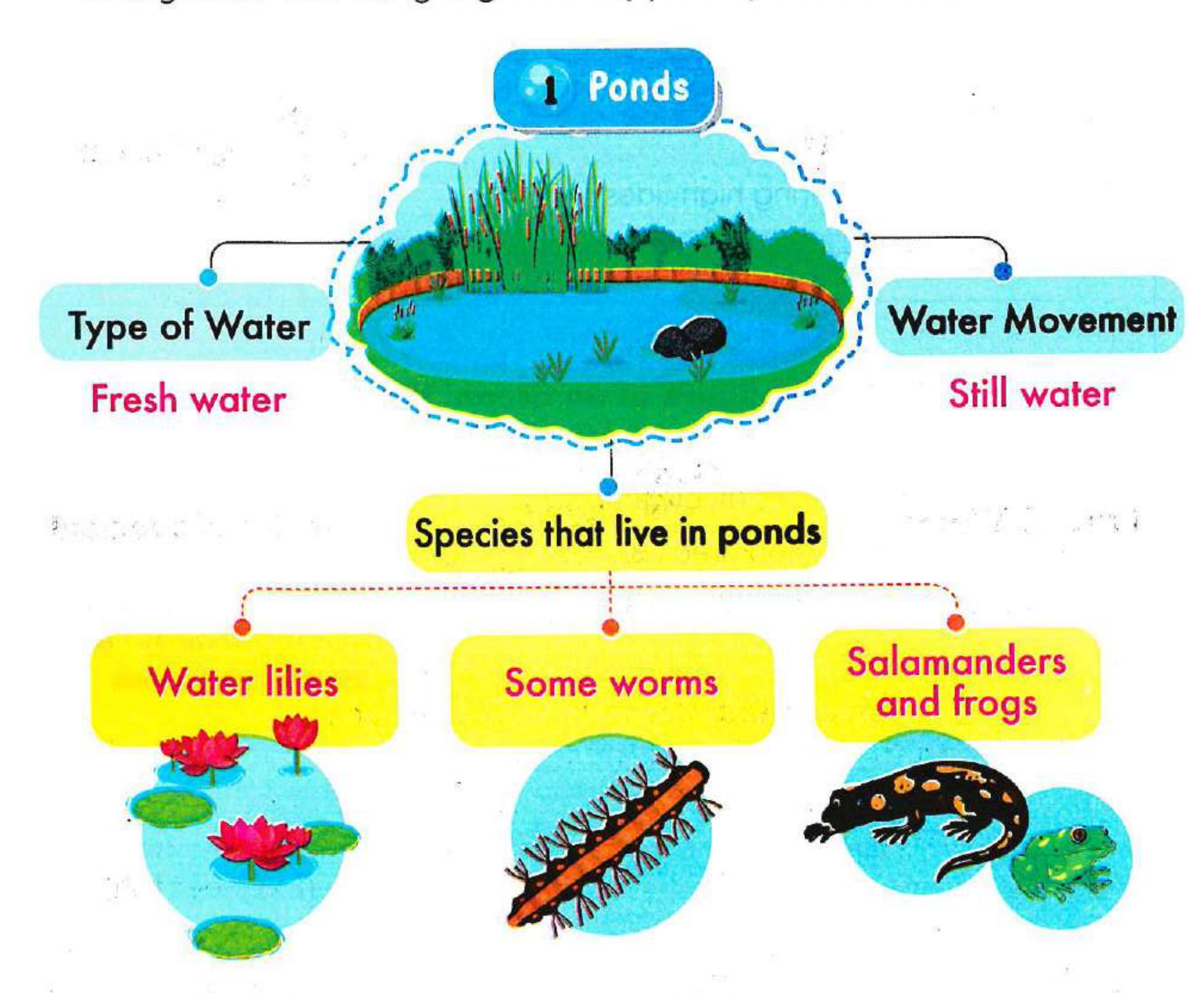
Lesson 5

Activity 9 Aquatic Ecosystems

Put (✓) or (✗):

1. Lakes always contain fresh water. ( )
2. Water is the habitat of many living organisms. ( )

In this activity, we are going to study three different aquatic ecosystems and living organisms (species) that live in them.



2 Streams

Type of Water

Fresh water

Water Movement

Running water
(Cool and flows fast)

Species that live in streams

- Salamon (Trout)
- Catfish

3 Oceans and Seas

Type of Water

Salt water

Water Movement

Constantly moving in the form of waves

Species that live in oceans and seas

- Kelp
- Dolphins
- Starfish
- Moses fish (Flounder fish)

NOTES:



- Oceans and seas include many smaller ecosystems.
- Ocean water circulates around the world in patterns called ocean currents.

- يوجد في البيئة البحرية العديد من الأنظمة البيئية الأصغر.
- تدور مياه المحيط حول العالم في أنماط تُسمى تيارات المحيط.

We can summarize all the previous information in the following table:

P.O.C	Ponds	Streams	Oceans and Seas
Type of Water	Fresh water	Fresh water	Salt water
Water Movement	Still water	Running water (Cool and flows fast)	Constantly moving in the form of waves
Species	• Water lilies • Some worms • Salamanders • Frogs	• Catfish • Salamon (Trout)	• Kelp • Dolphins • Starfish • Flounder fish (Moses fish)

Evaluate your learning!

Put (✓) or (✗):

1. Trout can live in running salt water. ( )
2. Kelps live in oceans, while salamanders live in ponds. ( )
3. Water lily can survive in salt water. ( )
4. Rivers and streams contain running water. ( )

Activity 10 Record Evidence Like a Scientist: Water's Impact

» You have learned about how the Earth's hydrosphere and biosphere interact.

How do you **describe** water's impact now?

Question:

» How does the Earth's biosphere interact with the Earth's hydrosphere?

My Claim:

» ....

....

....

Evidence:

» ....

....

....

Scientific Explanation with Reasoning:

» ....

....

....

Unit 3

Exercises on Lesson 5

Q1. Choose the correct answer:

1. Among animals that can be found in ponds are .... and .... (Cairo 2023)
   a. lions – salamanders b. dogs – frogs
   c. frogs – salamanders d. foxes – bears
2. .... belong to the biosphere in an ocean ecosystem.
   a. Salamanders b. Kelps c. Frogs d. Salmons
3. .... are types of plants that grow in ponds.
   a. Salamanders b. Kelps c. Salmons d. Water lilies
4. All the following species can live in still fresh water bodies,except ....
   a. frogs b. starfish c. salamander d. water lilies
5. .... and .... can live in oceans.
   a. Flounder fish - catfish b. Dolphin – trout
   c. Salmon – frogs d. Dolphin – Moses fish
6. .... can live in cool flowing water.
   a. Catfish b. Starfish c. Waterlily d. Moses fish
7. Water of .... is constantly moving in the form of waves.
   a. rivers b. ponds c. streams d. oceans

Q2. Put (✓) or (✗):

1. Some types of worms can live in still water bodies, such as streams. ( )
2. Salamanders and trout can live in ponds and oceans. ( )
3. Salamanders and frogs live in streams. (Gharbia 2023) ( )
4. Frogs and waterlilies are parts of the geosphere. ( )
5. Streams have hot and slow running water. ( )
6. Starfish and Moses fish live in seas. ( )
7. When waterlilies float on seawater, there's an interaction between the biosphere and hydrosphere. ( )

Q3. Complete the following sentences:

1. Starfish, and mosses fish live in .... which are considered the largest salt water ecosystems on the Earth. (Menofia 2023)
2. Some animals live in .... such as catfish and salmon . (Damietta 2024)
3. Ocean water circulates around the world in patterns called ....
4. .... is a plant that can live in still fresh water, while .... is a plant that can survive in salt water.

Q4. Cross out the odd word:

1. Catfish - Starfish - Kelp - Dolphin (Alex. 2024) (..........)
2. Frogs - Catfish - Trout - Starfish (..........)

Q5. Choose from column (A) what suits it in column (B): (Alex. 2024)

Column (A)	Column (B)
1 Moses fish	a. lives in still freshwater
2 Salmon	b. lives in running freshwater
3 Frog	c. lives in salt water

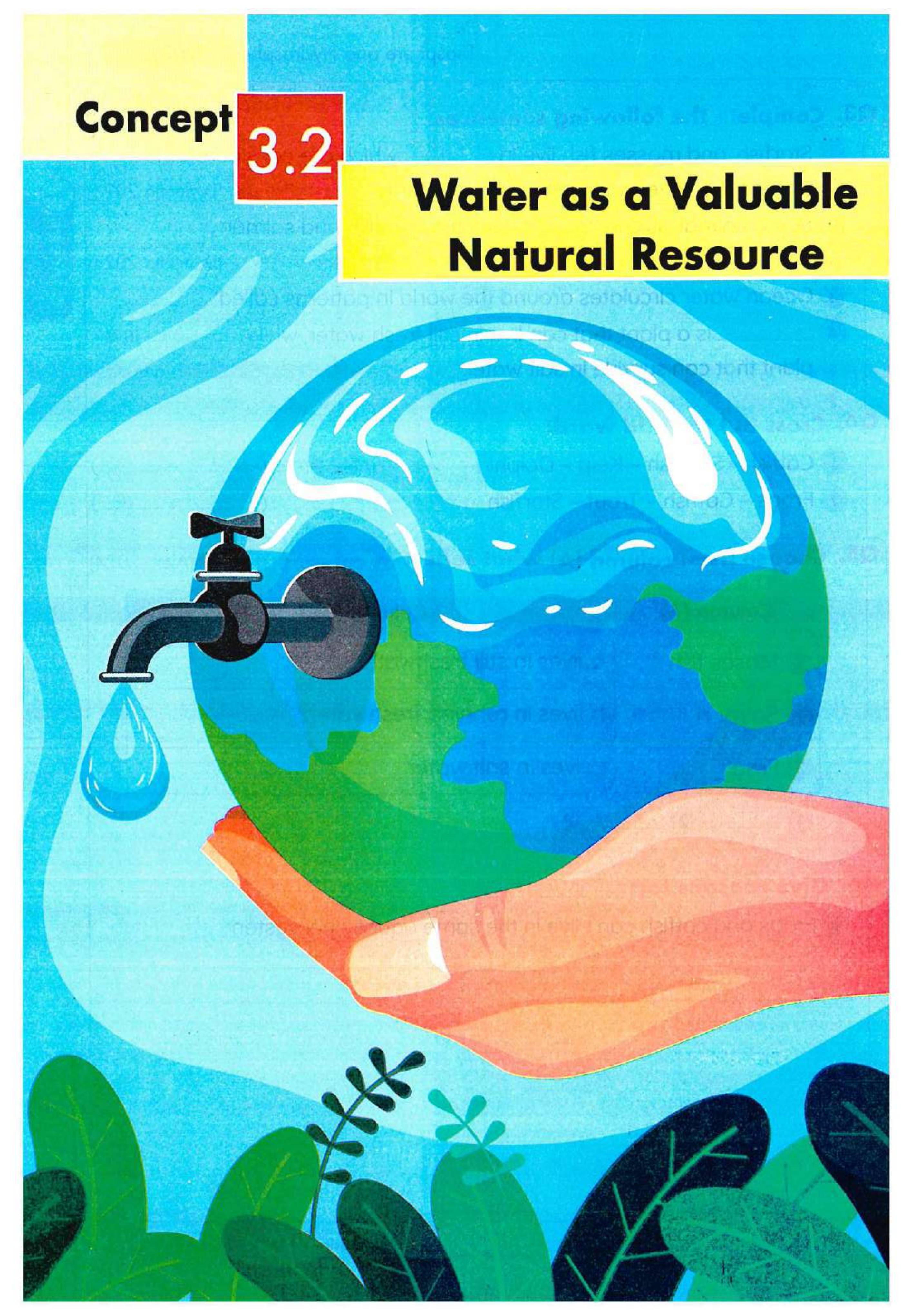
1 .... 2 .... 3 ....

Q6. Give reasons for:

1. Frogs and catfish can't live in the same aquatic ecosystem.

....

....


Concept 3.2
Water as a Valuable Natural Resource

Concept 2

Water as a Valuable Natural Resource

Lesson 1	
Activity 1	Can You Explain?
Activity 2	The Importance of Water
Activity 3	What Do You Already Know About Water as a Valuable Natural Resource?
Activity 4	Water of Earth

Lesson 2	
Activity 5	Earth's Fresh Water
Activity 6	Fresh Water: A Precious Resource

Lesson 3	
Activity 7	Watershed Predictions

Lesson 4	
Activity 8	Conservation, Preservation, and Sustainability
Activity 9	How Much Water Do You Use?

Lesson 5	
Activity 10	Drinking Water
Activity 11	Record Evidence Like a Scientist: The Importance of Water
Activity 12	Wastewater Engineers

Glossary

Concept (3.2)

Lesson (1)

Gold	ذهب	Silver	فضة	Low-lying area	منطقة منخفضة
Aluminum	الألومنيوم	Continents	القارات	Swamps	المستنقعات
Conserve	يحافظ	Pollution	التلوث	Agriculture	الزراعة
Fishing	الصيد	Transporting goods	نقل البضائع	Ponds	البِرَك
High dam	السد العالي				

Lesson (2)

Altitude	الارتفاع	Porous rocks	الصخور المسامية	Clouds	سُحُب
Definite channel	قناة محددة	Water cycle	دورة الماء	Renewable resource	مصدر متجدد

Lesson (3)

Scarcity	ندرة	Poor quality	جودة سيئة	Dry up	تجف
Extinction	انقراض	Limited (scarce)	محدود	Constant source	مصدر ثابت
Amphibians	البرمائيات	Watershed	مستجمعات المياه	Flooding	فيضان
Level of water	منسوب الماء				

Lesson (4)

Paper	ورق	Oil products	منتجات النفط	Overpopulation	الكثافة السكانية
Wool	صوف	Sustainability	الاستدامة	undrinkable	غير صالحة للشرب
Preservation	الحفاظ	Harvesting	استنزاف	Distribution	توزيع
Overfishing	الصيد الجائر	Deforestation	إزالة الغابات	Brushing teeth	غسل الأسنان
Cutting trees	قطع الأشجار	Overusing	الإفراط في		

Lesson (5)

Dirty water	مياه ملوثة	Charcoal	فحم نباتي	Waste materials	مخلفات
Cotton	قطن				

Lesson (5)

Wastewater	مياه الصرف الصحي	Water cycle	دورة المياه	Design	يصمم
Purposes	استخدامات	Treatment	معالجة	Community needs	احتياجات المجتمع
Recycling	إعادة تدوير	Quality	جودة		



Activity 1 Can You Explain?



There are many natural resources on Earth, such as:

Water	Plants	Metals (Gold, silver, aluminum)
		

- All these natural resources on Earth must be protected and conserved.

Water as a valuable natural resource on Earth's surface

- Most living organisms need fresh water to survive.

Problem	Reason	Solution
		
The amount of fresh water is limited on Earth.	Most of water on Earth is salt water.	We must conserve fresh water and prevent its pollution.

NOTES:

- Salt water can't be processed by most living organisms.
- Polluted water may harm humans, animals, and plants.

Activity 2 The Importance of Water

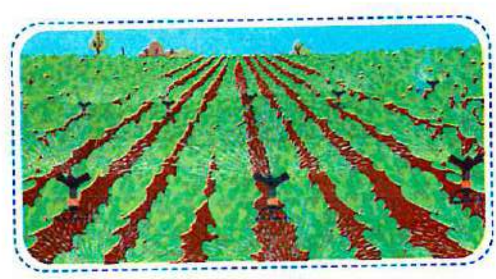
» You have learned that humans rely on water in many different ways, such as drinking, cleaning, and manufacturing ...etc.

Uses of Water

In Egypt, water is used in:



Generating electricity
(at Aswan High Dam)

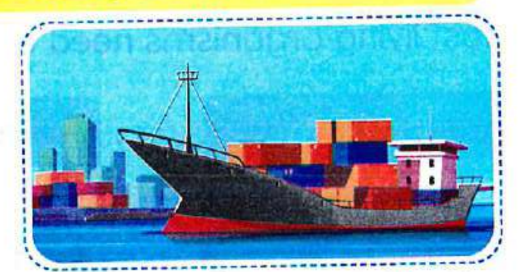


Agriculture

Around the world, water is used in many purposes such as:



Fishing



Transporting goods

Sources of Water

» There are many sources of water on Earth, such as:

- Oceans
- Seas
- Lakes
- Ponds
- Rivers
- Streams
- Rain
- Glaciers
- Groundwater

Evaluate your learning!

» ***Put (✓) or (✗):***

1. All water resources on Earth contain drinkable water. ( )
2. We must conserve fresh water as its amount is limited. ( )



What Do You Already Know About Water as a Valuable Natural Resource?

» Classify the sources of water into "fresh" or "salt" water:

Groundwater – Rain – Seas – Oceans – Rivers – Ponds – Streams – Glaciers

Sources of fresh water	Sources of salt water

Concept 2

Conserving Fresh Water

» Conserving water means that we use water in a correct way because the percentage of water that is available for drinking is very small compared to the percentage of water on Earth.

» We can conserve fresh water in many different ways, such as:

1. Turning off the faucet during brushing your teeth.



2. Taking a quick shower.



3. Turning off the water while washing your hair.









Evaluate your learning!

» ***Put (✓) or (✗):***

1. Conserving fresh water means using it in a correct way. (   )
2. The amount of fresh water is limited on Earth. (   )

Activity 4 Water of Earth

» In this activity, we will study some water bodies in details.

Water Bodies

1 A river:

Type of Water:	Fresh water
Location:	• A river often starts in: the mountains as a stream. • A river ends when it meets: a sea, or a larger river.

• تبدأ الأنهار من الجبال كمجرى مائي، وتنتهي في البحار أو في أنهار أكبر.



2 A lake:

Type of Water:	• Most lakes have fresh water. • Some lakes have salt water.
Location:	A lake forms when water collects in a low-lying area.
Description:	It is a large water body surrounded by land.

• تتشكَّل مياه البحيرة عندما تتجمَّع المياه في منطقة منخفضة. • مسطحات مائية كبيرة محاطة باليابسة من جميع الجهات.

3 A wetland:

Type of Water:	Fresh water
Location:	An land partially covered with water.
Types:	1 Swamps (marshes) 2 Ponds (bogs)

• مناطق يكون فيها منسوب الماء أعلى قليلًا من مستوى سطح الأرض. • من أنواعها المستنقعات والبِرَك.

Concept 2

4 An estuary:

Type of Water:	A mixture of fresh water and salt water.
Location:	Where a river meets an ocean or a sea

- An estuary is home to thousands of plants and animals.

• هو مكان التقاء النهر بالمحيط أو البحر. • تُعد مصبات الأنهار موطنًا لآلاف النباتات والحيوانات.



5 Groundwater:

Type of Water:	Fresh water
Location:	It is the water stored in the cracks and spaces of underground rocks.

- There is more amount of groundwater on Earth than all the water found in rivers and lakes.

• المياه الموجودة داخل شقوق ومسام الصخور الممتدة تحت الأرض. • يوجد على الأرض مياه جوفية أكثر من جميع المياه الموجودة في الأنهار والبحيرات.



6 Oceans:

Type of Water:	Salt water
Location:	Large **water bodies** that surround the continents.

- All oceans are connected to each other.
- The ocean's floor has **mountains**, **plains**, and **plateaus**.

• تحيط المحيطات بالقارات. • تتصل مياه المحيطات بعضها ببعض. • يضم قاع المحيط جبالًا وسهولًا ووديانًا.

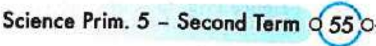


Evaluate your learning!

Complete using the words between the brakets:

(Rivers – Lakes – Estuaries – oceans)

1. .... contain fresh water or salt water.
2. .... contain fresh water only, while .... contain salt water only.
3. .... contain a mixture of salt water and fresh water.

Exercises on Lesson 1



Q1. Choose the correct answer:

1. .... is the basic liquid matter that is needed by humans, animals, and plants to survive. (Alex. 2023 /Cairo 2024)
   a. Milk b. Water c. Oil d. Alcohol

2. .... contains a suitable water for drinking.
   a. An estuary b. Mediterranean Sea
   c. Lake Assal d. Lake Nasser

3. The amount of salt water on Earth is .... the amount of fresh water. (Giza 2023)
   a. larger than b. smaller than c. equal to d. half

4. Humans can use water in all the following purposes, except .... (Cairo 2023)
   a. fishing b. generating electricity
   c. transportation d. weathering of rocks

5. We can conserve fresh water by ....
   a. drinking salt water
   b. decreasing the shower time
   c. taking a long shower
   d. keeping the faucet open all the day

6. .... and .... are considered sources of fresh water.
   a. Seas – rivers b. Seas – oceans
   c. Ponds – seas d. Streams – rivers

7. .... are formed when water collects in low lying areas. (Giza/ Cairo 2023)
   a. Seas b. Lakes c. Rivers d. Oceans

8. Estuary is formed when the water of .... meets the water of .... (Giza 2023)
   a. a river - a sea b. a sea - a wetland
   c. a sea - an ocean d. a river – groundwater

9. Swamps and ponds are kinds of ....
   a. lakes   b. wetlands   c. seas   d. rivers

10. All the following are found in the ocean floor, except ....
   a. plateaus   b. rivers   c. mountains   d. plains

11. .... is a land partially covered with water. (Qaliobia 2024)
   a. An ocean   b. An estuary   c. A wetland   d. A lake

12. When a river meets a sea, a/an .... is formed. (Gharbia 2024)
   a. lake   b. wetland   c. ocean   d. estuary

13. Rivers start at mountains in the form of ....
   a. estuaries   b. streams   c. seas   d. lakes

Q2. Put (✓) or (✗):

1. Among the sources of fresh water are rains. (Cairo 2023) (   )
2. The type of water in rivers is fresh water only. (Aswan 2023) (   )
3. An estuary is formed when salt water mixes with fresh water. (Alex 2024) (   )
4. The percentage of fresh water amount on Earth is unlimited (   )
5. Glaciers are considered resources of fresh water. (   )
6. Plants can grow in estuaries, but they can't grow in abyssal zones (   )
7. All oceans on Earth are separated from each other. (   )
8. Oceans and seas are saltwater bodies. (   )
9. Seas flow into the rivers at estuaries. (   )
10. There is more amount of groundwater on Earth than all the water found in rivers and lakes. (   )

Q3. Correct the underlined word:

1. Marshes and ponds are types of lakes. (....................)
2. A river often starts in the oceans as a stream. (....................)
3. Mountains, plains, and plateaus on the ocean's floor are included in the biosphere. (....................)
4. Continents are surrounded by rivers. (....................)

Unit 3

Q4. Write the scientific term:

1 The large water body that is surrounded by land.
(Cairo 2023) (........................)

2 A water body that has a mixture of salt water and fresh water.
(........................)

3 A land that is partially covered with water and it includes ponds and marshes. (........................)

4 The type of water stored in the cracks and spaces of underground rocks. (........................)

5 The water bodies that surround the continents.
(Alex. 2023/ Damietta 2024) (........................)

Q5. Complete the following sentences:

1 In Aswan high Dam, water is used to .... (Dakahlia 2023)

2 We must take a quick shower to conserve .... (Cairo 2023)

3 .... is a large water body surrounded by land. (Alex 2024)

4 When the water is stored in the cracks and spaces of underground rocks, ... is formed. (Cairo 2023)

5 When a river meets a sea, an .... is formed.
(Cairo 2023/ Port Said 2024)

6 Among the sources of fresh water are .... , rains, and groundwater. (Alex. 2024)

7 There is a (an) .... between Nile River and Mediterranean Sea.
(Dakahlia 2024)

8 A .... starts at a mountain as a stream.

9 The floor of .... may have mountains, ... and plateaus.

Q6. Cross out the odd word:

1 Marshes – Ponds – Glaciers – Seas (........................)

2 Rivers – Wetlands – Oceans – Groundwater (........................)

Q7. Give reasons for:

1. We should turn off the water while brushing our teeth.

....

2. We should conserve fresh water.

....

3. We can't drink water of estuaries.

....

4. Most of the water in the Earth's hydrosphere is not suitable for drinking.

....

Q8. What happens if :

1. People don't conserve fresh water? (Cairo 2024)

....

2. The river water meets the sea water? (Cairo - Qaliobia 2023/Aelx 2024)

....

3. Water collects in a low-lying area? (Kafr El-Sheikh 2024)

....

Q9. Study the following figure, then complete:



1. The water body in area number (......) contains a mixture of salt water and fresh water.
2. The water body in area number (......) contains salt water.
3. The water body in area number (......) contains fresh water.
4. The water body in area number 1 starts at .... in the form of a ....

Lesson 2

Activity 5 Earth's Fresh Water

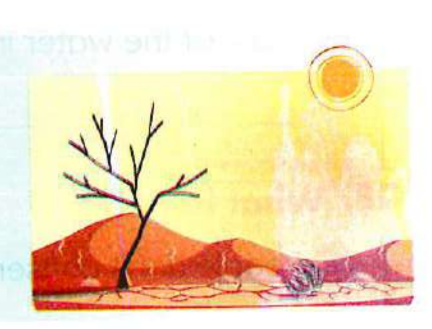
- Fresh water is very important for drinking, irrigation, agriculture, industry, and generating electricity.
- About 10% of the world's animal species live only in freshwater habitats.

• يعيش أكثر من 10 % من فصائل الحيوانات المختلفة في العالم في مواطن المياه العذبة فقط.



Risks that threaten fresh water:

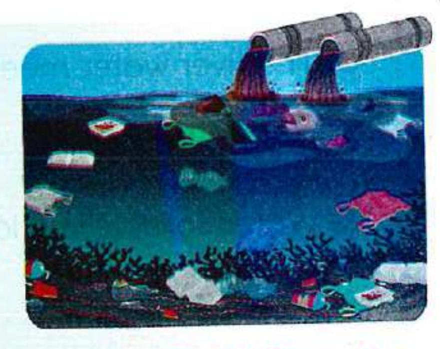
1 Scarcity of fresh water:



- The amount of fresh water is limited (scarce) in many parts of the world, which threatens the life of living organisms.

• المياه العذبة محدودة في معظم أنحاء العالم؛ مما يهدد حياة الكائنات الحية.

2 Poor quality of fresh water:



- Poor quality of fresh water leads to:
  1. The death of thousands of organisms every year.
  2. The extinction of some species of fish and amphibians that live in fresh water.

• نقص جودة المياه العذبة يؤدي إلى:

1 موت الآلاف من الكائنات الحية كل عام.

2 انقراض بعض الأسماك والبرمائيات التي تعيش في المياه العذبة.



Evaluate your learning!

Put (✓) or (✗):

1. Poor quality of fresh water has dangerous effects on living organisms. ( )
2. 10% of the world's animal species live only in saltwater habitats. ( )

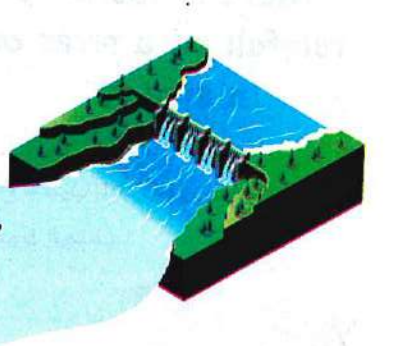
Activity 6 Fresh Water: A Precious Resource

- Much of the study of water focused on fresh water because of its vital importance for humans.
- Many people in the world still do not have access to fresh water because of drought.

• تتركّز معظم الدراسات المائية على المياه العذبة؛ لتأثيرها الحيوي والمهم للناس.
• لا يزال العديد من البشر حول العالم لا يستطيعون الوصول إلى المياه العذبة؛ بسبب الجفاف .

- One of the strategies that humans use to control and conserve fresh water for different purposes is building dams.

Dam

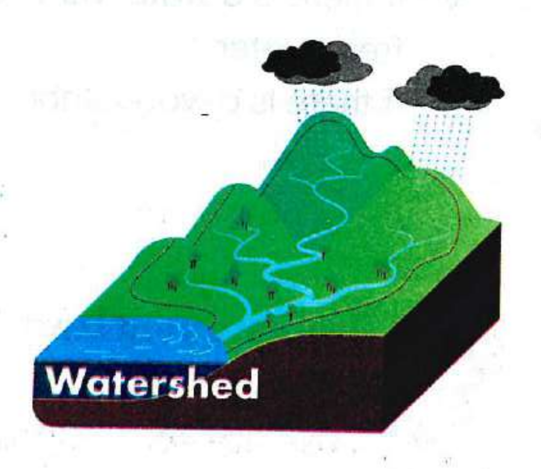


It is a structure built across the river to store, control, and conserve fresh water.

هو حاجز يتم بناؤه عبر النهر لتخزين المياه العذبة والتحكم فيها والحفاظ عليها.

Imagine it's raining! Where does rainwater go?

- After raining, the land and bodies of water work together to collect water in a common location that is called a watershed.



Watershed

It is an area of land where all the water from different sources flows (drains) in one direction towards a common location such as an ocean, a sea, or other large water body.

• مستجمعات المياه:
منطقة منخفضة الارتفاع تتدفق فيها المياه من مصادر مختلفة في اتجاه واحد نحو مكان واحد، مثل: محيط أو بحر أو أي مسطح مائي كبير.

Unit 3

The Effect of Rain on a Water Body

If	Then
There is more rainfall than a river or a stream can handle.	The water level will rise causing **flooding**.
There is too little rainfall on a river or a stream.	The water level will drop causing **drought**.





1 إذا كان هناك هطول للأمطار أكثر مما يمكن للنهر أن يحتويه؛ سيؤدي ذلك إلى ارتفاع منسوب المياه وحدوث الفيضانات.

2 إذا كان مقدار سقوط الأمطار قليلًا جدًّا؛ سيؤدي ذلك إلى انخفاض منسوب المياه وحدوث الجفاف.



NOTES:

- If there is a water balance, rivers will have a constant source of fresh water.
- If there is a water imbalance, drought or flooding may happen.

- إذا كان هناك توازن مائي؛ سيكون للأنهار مصدر ثابت للمياه العذبة.
- إذا كان هناك خلل في توازن المياه؛ فقد يحدث جفاف أو فيضانات.

Evaluate your learning!

Put (✓) or (✗):

1. If there is too little rainfall, the level of water will increase. ( )
2. Water balance may lead to drought or flooding. ( )
3. Dams are built on rivers to conserve salt water. ( )
4. The level of water in different water bodies is affected by the amount of rain. ( )

Exercises on Lesson 2

Q1. Choose the correct answer:

1. About 10% of the world's animal species live in ....
   a. freshwater bodies only
   b. saltwater bodies only
   c. saltwater lakes
   d. esturies

2. Humans can get the freshwater they need from all the following, except ....
   a. rivers
   b. seas
   c. groundwater
   d. streams

3. .... of fresh water may cause the extinction of some amphibians.
   a. Conservation
   b. Recycling
   c. Poor quality
   d. High quality

4. Most of water on Earth is .... (Cairo 2023)
   a. a mixture of fresh and salt water that is found in estuaries
   b. fresh water that is found in lakes
   c. fresh water that is found underground
   d. salt water that is found in oceans and seas

5. When there is more rainfall on a river, the water level in it will .... causing ....
   a. decrease – drought
   b. increase – drought
   c. increase – flooding
   d. decrease – flooding

6. A stream may dry up due to ....
   a. flooding
   b. too little rainfall on it
   c. more rainfall on it
   d. the increasing of the level of water in it

7. The area of land where all the water flows in one direction to a common location as ocean is called .... (Qalioubia 2023)
   a. wetland
   b. estuary
   c. watershed
   d. tributary

Q2. Put (✓) or (✗):

1. High quality of fresh water leads to the death of marine organisms that live in it. (Cairo 2024) (   )
2. From the risks that threaten the world is a large quantity of fresh water. (Sharkia 2024) (   )
3. We must conserve fresh water, because it is limited on Earth. (Alex. 2023) (   )
4. Scarcity and poor quality are among the risks that threaten freshwater resources on Earth. (   )
5. A watershed is an area where water from one source only flows towards it. (Baheira 2023/ Cairo 2024) (   )
6. Humans build dams to control and conserve salt water. (   )
7. When the rate of the rainfall on a river increases, the river may dry up. (   )

Q3. Write the scientific term:

1. It is an area of land where all the water flows in one direction to a common location such as an ocean, a sea, or another large water body. (Cairo 2023/ Qaliobia 2024) (.................)
2. The type of water in which about 10% of the world's species live in. (.................)

Q4. Complete the following using the words between the brackets:

(flooding - decrease - watershed - rivers - freshwater - drought)

1. About 10% of the world's animal species live in .... bodies, such as .... and streams.
2. When the rate of rainfall decreases, the level of water in rivers will .... causing .... (Giza 2023)
3. When a stream or river receive more rainfall, it leads to .... (Qaliobia 2024)
4. .... is an area of land where water from different sources flows towards a common location. (Qaliobia 2023)

Q5. Give reasons for:

1. Scientists tend to preserve fresh water on earth. (Alex. 2024)

....

2. The poor quality of fresh water affects the living organisms that live in it.

....

3. Extinction of some species of fish and amphibians that live in freshwater habitats.

....

4. Humans build dams on rivers.

....

Q6. What happens if:

1. The quality of fresh water becomes poor? (Aelx 2024)

....

2. The rate of rainfall on a river increases?

....

3. The level of water in a stream keeps decreasing?

....

Q7. Study the following figure, then choose the correct answer:



1. The following figure represents the formation of .... (a watershed – a mountain)
2. Water flows from .... to .... (area A area B – area B area A)
3. Area A could be .... (a lake – a swamp)

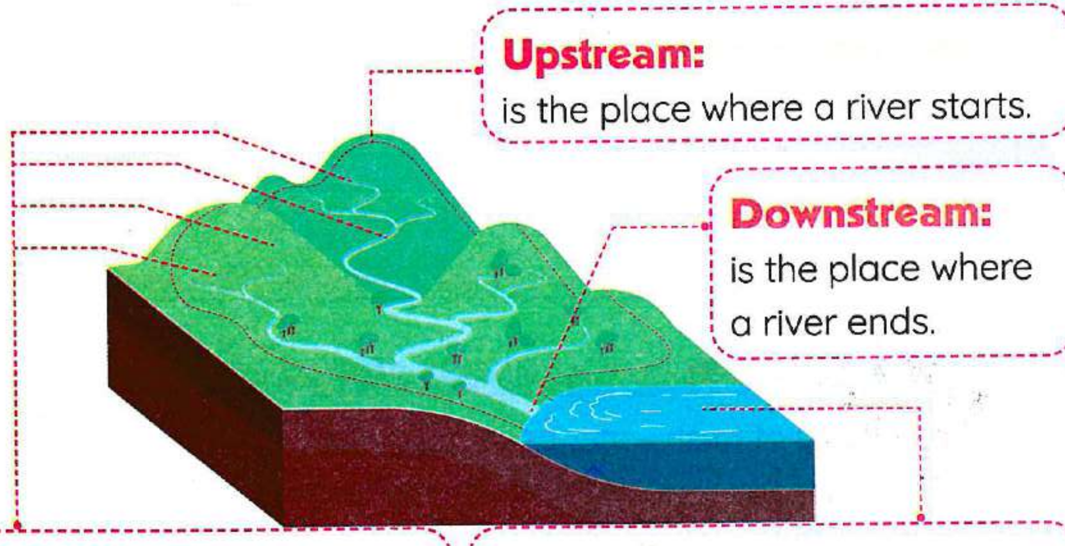
Lesson 3

Activity 7 Watershed Predictions

- Rivers start their journey upstream and end downstream.
- All water bodies are connected together, so what happens upstream will affect the water bodies downstream.

• يبدأ النهر رحلته من المنبع وينتهي عند المصب.

• المسطحات المائية متصلة ببعضها؛ ولذلك فإن ما يحدث فى المنبع سوف يؤثر على المسطحات المائية فى اتجاه المصب.



Tributaries:
They are small water bodies, such as small creeks or streams, that flow into bigger rivers.

الروافد:
مسطحات مائية صغيرة مثل الجداول الصغيرة التي تتدفق إلى أنهار أكبر.

Watershed:
It is an area of land where all the water from different sources flows towards a common location.

مستجمع المياه:
منطقة منخفضة الارتفاع تتجمع فيها المياه من مصادر مختلفة.



- Some human bad activities may affect river tributaries and then affect people, animals, and plants near these tributaries.

• قد تؤثر بعض الأنشطة البشرية على روافد الأنهار، ثم تؤثر على الناس والحيوانات والنباتات القريبة من تلك الروافد.

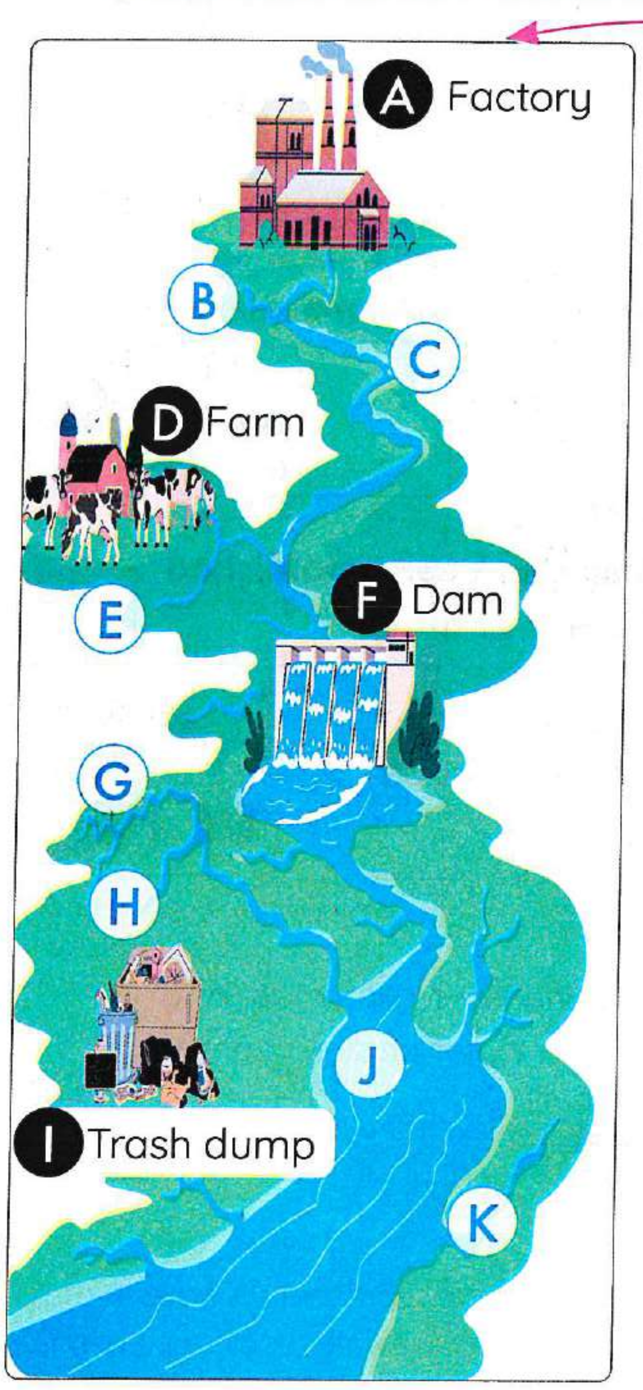
Concept 2

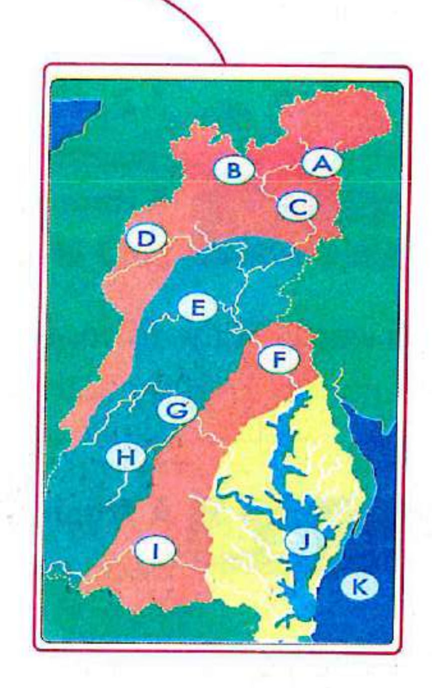
Watershed Map

» Watershed map helps scientists understand how water bodies interact with each other.

• يمكن لخريطة مستجمعات المياه أن تساعد العلماء على فهم كيفية تفاعل المسطحات المائية مع بعضها البعض.

Use the information in the watershed map to predict which other water bodies would be affected when:





The blue color in the watershed map represents water bodies.

Scenario 1: A factory is built near tributary in area (A):



- Water in the tributary near the area (A) carries wastes of the factory to tributaries (B) and (C) causing water pollution.

Scenario 2: A dam is built across a tributary at area F:



- The dam will hold water behind it.
- Water levels rise in tributaries (C), (D), and (E).
- Water level drops in tributary (J).

Scenario 3: A farm using chemical fertilizers or having a herd of cows exists near the tributary in area D.



- The waste of the farm will be carried to tributaries (E) and cause water pollution.

Scenario 4: A trash dump has been established near a tributary at area I:



- On windy days, litter will be blown into the water at tributary (I), and then litter will be carried to tributaries (J) and (K).

NOTES:

- Human activities that occur nearer to upstream and downstream tributaries affect water bodies near them.



Evaluate your learning!

» Put (✓) or (X):

1. The blue color in the watershed map represents a water body. ( )
2. What happens downstream will affect the water bodies upstream. ( )

Exercises on Lesson 3

Q1. Choose the correct answer:

1. Small .... and .... are examples of river tributaries.
   a. bays – creeks
   b. creeks – oceans
   c. seas – streams
   d. streams – creeks

2. Tributary usually ends by the flowing of its water into bigger .... (Damietta 2023)
   a. sea
   b. ocean
   c. lake
   d. river

3. What's the correct sequence of the flow of water through the following water bodies?
   a. A stream - an ocean - a bigger river
   b. A big river - a stream - a sea
   c. A creek - a bigger river - an ocean
   d. An ocean - a river - a creek

4. All the following reasons cause water pollution in a river, except .... (Aswan 2023)
   a. litter of a nearby trash dump
   b. building a dam across the river
   c. chemical fertilizers of a nearby farm
   d. waste of a nearby factory

5. Dam can hold the water behind it which causes a change in the .... of water in water bodies.
   a. quality
   b. type
   c. amount
   d. temperature

6. The water of a big river flows into large bodies of water, such as .... or ....
   a. a creek - a bay
   b. a bay - an ocean
   c. a sea - a creek
   d. a stream - an ocean

7. If a farm near a tributary that uses ...., it causes water pollution to water bodies near it.
   a. natural fertilizers
   b. fresh water
   c. chemical fertilizers
   d. salt water

Q2. Put (✓) or (✗):

1. Upstream is the place where a river starts. (Cairo 2023) (   )
2. Water can flow from a bigger river to a tributary. (   )
3. The water of a small stream flows into a bigger river. (   )
4. The water of tributaries flows directly into seas or oceans. (Aelx 2024) (   )
5. On building a dam on a river, the water level in this river will not change. (   )
6. Tributaries are large bodies of water that flow into a bigger river. (   )
7. Some human activities are responsible for water pollution. (Dakahlia 2024) (   )
8. Dams can hold water behind them. (Cairo 2024) (   )

Q3. Write the scientific term:

1. They are small water bodies, such as creeks or steams that flows into bigger rivers. (..................)

Q4. Complete the following using the words between the brackets:

(quality - tributary - amount- Dams – wind)

1. Litter of a trash dump near a .... is blown by.............. to the other
2. Water bodies connected to it.
3. Building a factory near a tributary affects the water .... of other water bodies connected to this tributary.
4. Building a dam across a tributary affects the .... of water in other water bodies connected to this tributary.
5. .... are established across a river to hold water behind them.

Q5. Give reasons for:

1. Farms near tributaries may cause water pollution. (Giza 2023

....

2. What happens near a tributary affects other water bodies near this tributary.

....

Q6. What happens to water bodies that are connected to a tributary if:

1. A factory is established near this tributary?

....

....

2. A dam is built across this tributary?

....

....

3. A farm near this tributary uses chemical fertilizers?

....

....

4. Wind blows wastes of trash dump into the water of this tributary?

....

....

Q7. Study the following figure, then put (✓) or (✗):

1. The water body in area (A) could be a creek. ( )
2. The water body in area (D) could be a sea. ( )
3. On building a factory in area (C), the water body in area (D) will be polluted. ( )
4. The water body in area (B) could be an ocean. ( )
5. On establishing a dam on the water body in area (A), the amount of water in area (E) will change. ( )

Lesson 4

Activity 8 Conservation, Preservation, and Sustainability

Many of the products that we use every day are made from natural resources, such as:



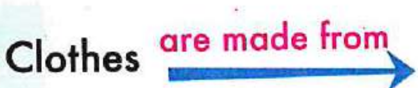
Products		Natural Resources
Paper	is made from	trees.
Plastic	is made from	oil products.
Clothes	are made from	plants, such as cotton. animals, such as the wool of sheep.













It is important to conserve these natural resources, so they will be enough when we need them

Humans can conserve natural resources by:



1. Preservation of resources
الحفاظ على الموارد



2. Sustainability
الاستدامـــة

1 Preservation of Resources

- It means restricting access (control reaching) of humans to these natural resources or using them.

• هو الحد من وصول الإنسان للموارد الطبيعية أو استخدامها.

Examples of Resources Preservation

- Establishing protected areas of land to prevent the use or development of natural resources in them, where resources cannot be harvested (depleted), such as:

1 Ras Mohammed Protectorate (In South Sinia)



2 Wadi Al-Hitan Protectorate (In Fayoum)



• تخصيص مناطق محمية بغرض حماية الموارد من الاستنزاف، مثل: محمية رأس محمد في جنوب سيناء، ومحمية وادي الحيتان بالفيوم.

Examples of the results of overusing (depletion) of natural resources more quickly than they can be replaced:

Overfishing



If the consumption of fish by humans increases more than the fish are replaced by reproduction, **that causes:**

1. Fish in oceans become rare.
2. Fishing will decrease.

Overusing groundwater



If the groundwater of wells is used faster than it is replaced by rains, **that causes:**

1. The groundwater of wells run out.
2. The wells dry up.

Unit 3

2 Sustainability

- It means using natural resources in a way that does not negatively affect the future supply of these resources.

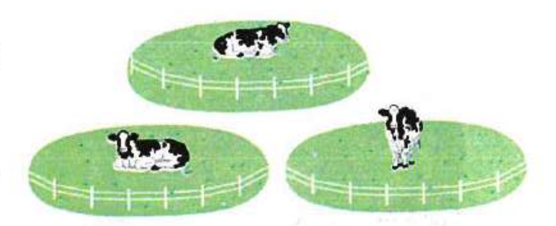
• هو استخدام الموارد الطبيعية بطريقة لا تؤثر سلبًا على تلك الموارد مستقبلًا.

- Sustainability is an important way of resource conservation.

Examples of Resource Sustainability

Unsustainable situation: Cows are placed in many small areas of grass.

1. Cows begin to eat all the grass before the new grass grows back.
2. The grass will disappear in these areas.
3. Cows will be hungry.



• إذا وضعت الأبقار في العديد من المناطق الصغيرة من العشب، تبدأ الأبقار في أكل كل العشب قبل أن ينمو العشب الجديد، وسوف يختفي العشب؛ مما يتسبب في تعرُّض الأبقار للجوع الشديد.

Sustainable situation: Cows are placed in one large area of grass.

1. The grass will grow back in other areas.
2. Cows will still have more food.



•إذا وُضعت الأبقار فى مساحة كافية، سينمو العشب مرة أخرى؛ حيث سيظل لدى الأبقار الكثير من الغذاء.

The resource's sustainability is affected by:

Overpopulation	Pollution	Overusing of resources	Unequal distribution of resources
الكثافة السكانية	التلوث	الإفراط في استهلاك الموارد	التوزيع غير المتكافئ للموارد

Renewable doesn't mean unlimited.

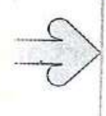
القابلية للتجدُّد لا يعني بالضرورة الاستدامة



When fresh water is polluted:

(Renewable resource)

- The water becomes undrinkable.

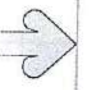


Burning coal and oil:

(Nonrenewable resource)

- Leads to soil pollution that leads to the death of animals and plants.





Cutting down too many trees:

(Renewable resource)

- Leads to deforestation, so wind and water carry away soil into another places, causing soil erosion.



- تلوث المياه العذبة: يتسبب التلوث في جعل الكثير من مياه الأرض غير صالحة للشرب.
- حرق الموارد غير المتجددة: يتسبب حرق الفحم أو البترول في تلوث التربة وموت النباتات والحيوانات.
- قطع الكثير من الأشجار: يؤدي إلى إزالة الغابات؛ وبالتالي فإن الرياح والمياه تحمل التربة بعيدًا إلى أماكن أخرى، مسببة تعرية التربة.

NOTES:

- Preservation of natural resources means preventing the use or development of natural resources in special areas.
- Sustainability of natural resources means managing the use of natural resources without negatively affecting their amount in the future.

Activity 9 How Much Water Do You Use?

- We use water every day for many different activities, such as:

Washing hands | Brushing teeth | Taking a shower | Flushing a toilet | Cooking food | Cleaning vegetables

- This activity will help you find out the amount of water that you use every day.

The table below explains how to calculate the average amount of water used by one person.

Activity That Requires Water	Time taken to do this activity (Min)		Amount of water used each minute (Liter)		Total amount of water used to do this activity each time
Taking a Shower	5	x	2	=	10 liters

If a person repeats this activity two times in one day:

10 x 2 = 20 liters

- 10: Amount of water used to do this activity each time
- 2: Number of times you repeat this activity in one day
- 20 liters: Total amount of water used to do this activity in one day

How to conserve water during daily activities



1. Turn off the water during brushing your teeth.
2. Decrease your shower time.



Exercises on Lesson 4

Q1. Choose the correct answer:

1. Clothes are made from plants, such as .... (Giza/ Gharbia 2024)
   a. corn b. cotton c. trees d. beans
2. Plastic spoons are made from ....
   a. animals products b. trees
   c. oil products d. paper
3. .... and .... can be made from plants.
   a. Paper – plastic bags b. clothes – books
   c. Plastic bottle – books d. Paper – glass cups
4. .... and .... are ways of conserving natural resources.
   a. Overusing – sustainability b. Preservation – overpopulation
   c. Sustainability – preservation d. Preservation – deforestation
5. Prevent developing of Ras Mohammed Protectorate is considered as an example of .... (Cairo 2023)
   a. preservation b. pollution
   c. sustainability d. consumption
6. When humans rationalize natural resources to keep them available in the future, this is called ....
   a. preservation b. overpopulation
   c. over-consumption d. sustainability
7. All the following are sustainable situations, except ....
   a. using fossil fuel wisely
   b. recycling paper and plastic products
   c. putting a herd of sheep in one large grassy area
   d. putting a herd of sheep in many small grassy areas
8. All the following are factors that affect resources' sustainability, except ....
   a. pollution b. overpopulation
   c. overconsumption of resources d. equal distribution of resources

9 .... and .... are among nonrenewable natural resources.

a. Trees – oil b. Coal – water c. Water – trees d. Oil – coal

10 When .... runs out, wells will dry up.

a. seawater b. groundwater c. fossil fuel d. saltwater

11 Deforestation causes .... and .... to carry away soil causing soil ersoion.

a. oil – wind b. water – coal c. wind – water d. trees – water

12 If you use 30 liters of water to take a 10-minute shower, you may use .... of water if you decrease the time of your shower.

a. 30 liters b. 60 liters c. 50 liters d. 25 liters

Q2. Put (✓) or (X):

1 Plastic cups are made from oil products. ( )

2 Wadi Al-Hitan Protectorate is an example of sustainability. ( )

3 Unequal distribution of natural resources leads to the unsustainability of these resources. ( )

4 Preservation of coal and oil means managing their use without affecting their amount in the future. ( )

5 Resource sustainability isn't affected by over population. (Kafr El-Sheikh 2024) ( )

6 Placing some cows in one large area of grass is an example of an unsustainable situation. ( )

7 You can conserve water by leaving the tap open while brushing your teeth. (Dakahlia 2024) ( )

8 You must decrease the time of taking a shower to conserve fresh water. (Aelx 2024) ( )

9 Groundwater is replaced by rain. ( )

10 When fresh water is polluted, it becomes drinkable. ( )

11. Water is considered a nonrenewable natural resource. (Giza 2023) (   )
12. You must decrease the time of taking a shower to conserve fresh water. (Alex 2024) (   )

Q3. Correct the underlined words:

1. Clothes can be made from <u>plants</u> products such as wool of sheep. (..........)
2. Ras Mohammed Protectorate is located in <u>Fayoum</u>. (..........)
3. Overfishing leads to <u>increasing</u> the number of fish in oceans and seas. (..........)
4. Cutting down trees causes deforestation and soil <u>deposition</u>. (..........)
5. You should <u>increase</u> the time of washing your hands. (..........)

Q4. Write the scientific term:

1. The action of control reaching of humans to the natural resources or using them. (Giza 2023/ Damietta 2024) (..........)
2. It means using natural resources in a way that does not negatively affect their future supply. (..........)

Q5. Complete the following using the words between the brackets:

(fossil fuel – plants – preservation – soil erosion – death – animals – deforestation)

1. Clothes can be made from .... products or .... products. (Ismailia 2023)
2. Cutting down too many trees causes .... that leads to ....
3. Burning .... causes soil pollution that leads to .... of plants and animals.
4. .... of natural resources means restricting access to or using these resources.

Q6. Choose from column (A) what suits it in column (B): (Dakahlia 2023/ Alex. 2024)

Column (A)	Column (B)
1 Oil products	a. can be used in making paper.
2 Cotton	b. can be used in making clothes.
3 Trees	c. can be used in making plastic.

1 .... 2 .... 3 ....

Q7. Give reasons for:

1 We should turn off water during washing dishes. (Cairo 2023)

....

2 Deforestation leads to soil erosion.

....

Q8. What happens if:

1 People in Siwa Oasis overuse the groundwater without being replaced by rains?

....

2 Cutting down trees in a fast rate?

....

3 Burning large amounts of fossil fuel?

....

Q9. Study the following figures, then complete:

Farm A



Farm B



1 Farm (.......) is an example for a sustainable situation.

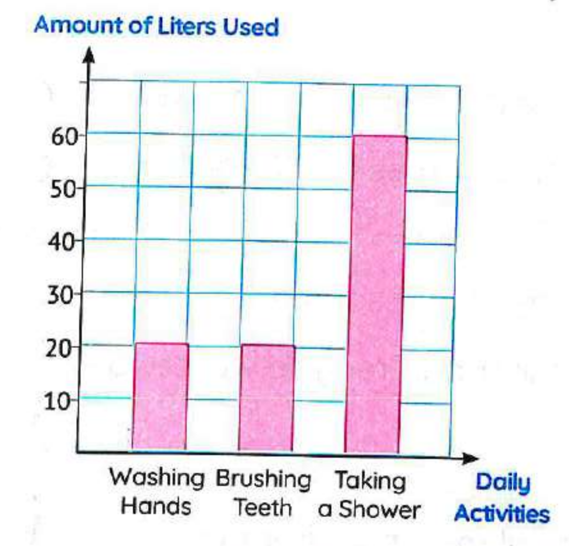
2 In farm (......), cows may be hungry after a short time.

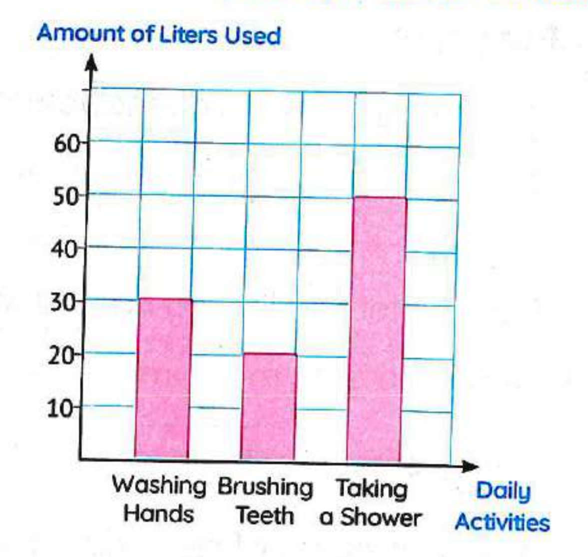
3 In farm (......), there is plenty of food.

Concept 2

Q10. Study the following two graphs that illustrate the amount of water used daily by two families, then choose the correct answer:

(Note: All members in each family use equal amounts of water.)





Family (A)
4 members

Family (B)
3 members

1. Family (A) and family (B) use the same amount of water in ....
   - a. washing their hands
   - b. brushing their teeth
   - c. taking a shower
2. The total amount of water used by family (A) is .... the amount used by family (B).
   - a. more than
   - b. less than
   - c. equal to
3. Family (A) uses more amount of water than family (B) in ....
   - a. washing their hands
   - b. brushing their teeth
   - c. taking a shower
4. Family (A) uses less amount of water than family (B) in ....
   - a. washing their hands
   - b. brushing their teeth
   - c. taking a shower
5. The amount of water used by each member in family (A) is .... the amount used by each member in family (B).
   - a. more than
   - b. less than
   - c. equal to

Lesson 5

Activity 10 Drinking Water

Put (✓) or (✗):

1. Although water is a renewable resource, we must not waste it. (   )
2. If we add mud to water, the water becomes undrinkable. (   )

- Fresh water is a limited natural renewable resource.
- Humans create many methods to filter and recycle wastewater.

Recycling wastewater.

It is the process of removing harmful materials from water.



Experiment: Making a Model of Water Filter

Tools:



Plastic bottle



Scissors



Charcoal



Cotton balls



Sand

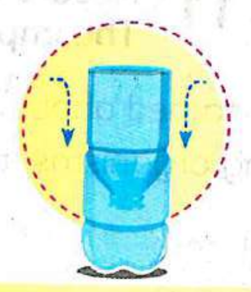


Dirty water
(mud + clear water)

Steps:



① Cut off the upper part of the plastic bottle.



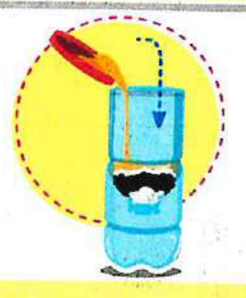
② Place it upside down on the lower part of the bottle



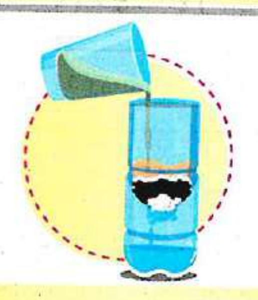
③ Put the cotton balls in the upper part of the bottle.



④ Put charcoal above the cotton balls.



⑤ Put sand above the charcoal.



⑥ Pour the dirty water on the filter.

Observation:

The filter removes most of the dirt from the dirty water.



Conclusion:

The filter model helps us remove harmful materials from the polluted water to get filtered water.

Activity 11 Record Evidence Like a Scientist: The Importance of Water

» You have learned about water as a valuable source and its **importance** for all living organisms that live on Earth.









Question:

» How can you describe the importance of water now?

My Claim:

» ....

....

Evidence:

» ....

....



Scientific Explanation with Reasoning:

» ....

....



in Action

Activity 12 Wastewater Engineers

- We must conserve fresh water during our daily activities by changing our habits.

Recycling Water


The Water Cycle

- Solar energy drives the water cycle in nature.
- Humans also can recycle wastewater and reuse it for many purposes.

• تعد الطاقة الشمسية هي المحرك الأساسي لدورة الماء في الطبيعة.

• يستطيع الإنسان إعادة تدوير المياه المستخدمة سابقًا، وإعادة استخدامها في العديد من الأغراض.

- Wastewater is the water that has already been used in homes and in different industries.

Wastewater engineers

- They are special kinds of scientists that work in water treatment plants, such as Bahr Al-Baqar wastewater treatment plant in Egypt.

• يعمل مهندسو معالجة مياه الصرف الصحي في محطات معالجة المياه، مثل: محطة بحر البقر في مصر.

Waste water treatment plants: They are stations that recycle wastewater by removing harmful materials from it to reuse it again

• محطات معالجة مياه الصرف الصحي:

هي محطات تعمل على إعادة تدوير مياه الصرف الصحي

بإزالة المواد الضارة منها لإعادة استخدامها مرة أخرى.



The role of wastewater engineers in recycling wastewater:

Their role before recycling wastewater:

1. They decide where to build water treatment plants.
2. They design tools that provide us with clean water.
3. They check the water quality and the amount of pollutants in the water.

• دور مهندسي معالجة مياه الصرف الصحي قبل عملية معالجة المياه:
– يقومون بتحديد أماكن إنشاء مرافق معالجة المياه.
– يقومون بتصميم أدوات تساعدنا للحصول على مياه نظيفة. – يقومون بالتحقق من جودة المياه وكمية الملوثات في الماء.

Their role during recycling wastewater:

They observe and check each step in the process.

• دور مهندسي معالجة مياه الصرف الصحي أثناء عملية معالجة المياه:
– يراقبون ويتحققون من كل خطوة من خطوات عملية معالجة المياه.

Their role after recycling wastewater:

They test the treated water to make sure it is safe to be released to rivers and lakes or used by humans.

– اختبار المياه التي تمت معالجتها قبل أن يستخدمها الإنسان؛ للتأكد من كونها آمنة وصالحة لإطلاقها في الأنهار والبحيرات.

Their role in protecting community:

1. They design ways to protect a community from floods.
2. They test the sources of drinking water to make sure it is safe.

• دور مهندسي معالجة مياه الصرف الصحي في حماية المجتمع:
– يقومون بتصميم طرق لحماية المجتمعات من الفيضانات.
– يقومون باختبار مصادر مياه الشرب؛ للتأكد من أنها آمنة للاستخدام.

Evaluate your learning!

Put (✓) or (X):

1. Biologists are scientists that work in water treatment plants. ( )
2. Wastewater is the water that has already been used in homes. ( )

Exercises on Lesson 5

Q1. Choose the correct answer:

1. All the following materials can be used to filter wastewater in simple water filter, except .... (Giza 2023)
   a. cotton b. sand c. wood d. charcoal

2. .... are used to remove harmful materials from polluted water.
   a. Dams b. Turbines c. Water filters d. Magnets

3. All of these materials can be removed by a simple water filter, except ....
   a. mud b. rock pieces c. salt d. dirt

4. In a water filter, ... is the first material through which polluted water passes.
   a. sand b. charcoal c. cotton d. paper

5. .... water means removing waste materials from it.
   a. Conserving b. Recycling c. Draining d. Polluting

6. .... process is used to get filtered water from polluted water. (Gharbia 2023)
   a. Recycling b. Sustainability c. Preservation d. Conservation

7. Water cycle is considered as an example of .... (Cairo 2023)
   a. overusing water
   b. preservation of water
   c. recycling water
   d. conservation of water

8. .... must test the treated water to make sure it is safe to be used by humans.
   a. Wastewater engineers
   b. Hydrologists
   c. Botanists
   d. Electrical engineers

9. .... is a wastewater treatment plant in Egypt.
   a. Wadi Al-Hitan Protectorate
   b. Bahr Al-Baqar
   c. High Dam
   d. Ras Mohammed Protectorate

Q2. Put (✓) or (✗):

1. Adding some mud to clear water can pollute it. (Giza 2023) (   )
2. Recycling of wastewater means removing waste materials from it. (Qaliobia 2024) (   )
3. Cotton, characoal and mud can be used in making a simple water filter. (Damietta 2024) (   )
4. Water filters are used to remove harmful materials from polluted water. (   )
5. Some human activities are responsible for water pollution . (Dakahlia 2024) (   )
6. Wastewater engineers design tools to pollute water. (   )
7. Wastewater engineers can test the quality of water by checking for the amount of pollutants in water. (   )
8. Farmers test the sources of drinking water in communities to make sure it is safe to drink. (   )
9. Dams can be used to filter polluted water once again. (Giza 2023) (   )

Q3. Write the scientific term:

1. It is the water that has already been used in homes and different industries. (Fayoum 2023) (.................)
2. The scientists who work in water treatment plants. (Luxor 2023) (.................)
3. The scientists who design tools that provide us with clean water. (.................)
4. They are plants that recycle wastewater by removing waste materials from it to reuse it again. (.................)

Q4. Complete the following sentences:

1. Cotton, ... and .... can be used in making a simple water filter. (Sohag 2023)
2. Water treatment plants recycle the .... by removing harmful materials from it to reuse it again. (Giza 2023)
3. Water is replaced in nature through ....

4. .... of wastewater means removing waste materials from it.
5. Wastewater engineers can test the quality of the treated .... by checking for the amount of .... in the water. (Cairo 2023)
6. The wastewater engineer designs ways to protect the community from .... (Aelx 2024)
7. Wastewater engineers decide where to build ....
8. Treated water is released into .... and .... after finishing its treatment process.

Q5. Give reasons for:

1. Wastewater engineers test the treated water before releasing it into rivers and lakes.

....

2. Scientists tend to create methods to filter polluted water.

....

Q6. What happens if:

- You mix clear water with small amount of mud? (Giza 2023)

....

Q7. Study the following figure, then answer the questions below:

1. What is the name of the opposite model?

....

2. Label the figure:

A. .... B. ....

C. .... D. ....

E. ....

A
B
C
D
E

3. What is the importance of this model?

....

4. What is the name of this process?

....

Theme 4

Change and Stability

Unit 4 Patterns in the Sky

Concept 1 Effects of Gravity

Concept 2 Patterns of Motion in the Sky

Get Started
What I Already Know

When you look at the sky during the day:

- You will observe that the Sun rises from the east and sets from the west.
- You can observe the change in the length and location of shadows of objects.

• أثناء نظرك للسماء خلال النهار، فإنك ستلاحظ أن الشمس تشرق من الشرق وتغرب من الغرب، كما ستلاحظ تغيُّر طول الظل ومكانه.



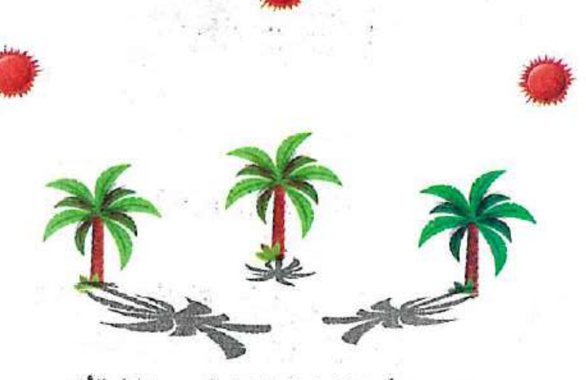
When you look at the sky during the night:

- You will observe that the stars appear to move in the sky.
- You will observe the change in the shape of the moon during the month.

• أثناء نظرك للسماء خلال الليل، فإنك ستلاحظ أن النجوم تتحرَّك في السماء، كما ستلاحظ تغيُّر شكل القمر خلال الشهر.

Shadow Formation

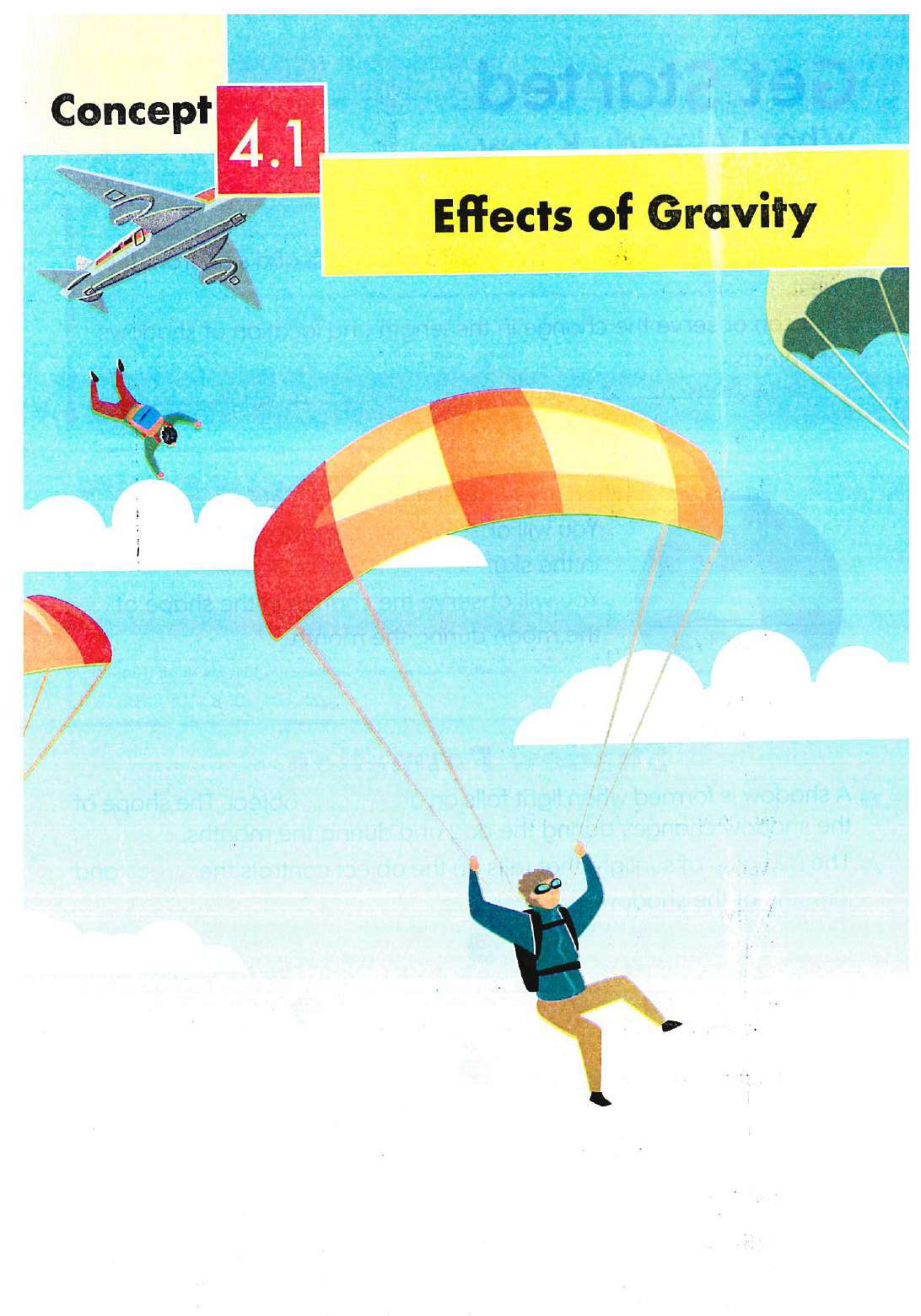
- A shadow is formed when light falls on an opaque object. The shape of the shadow changes during the day and during the months.
- The direction of sunlight that falls on the object controls the length and location of the shadow.



• يتكوَّن الظل عندما يسقط الضوء على جسم معتم، ويتغيَّر شكل الظل خلال اليوم وخلال الأشهر.
• يتحكم اتجاه ضوء الشمس الذي يسقط على الجسم في طول الظل ومكانه.

Concept 4.1

Effects of Gravity



Concept 1

Effects of Gravity

Lesson 1	
Activity 1	Can You Explain?
Activity 2	Gravity
Activity 3	Effect of Gravity on the Movement of Objects

Lesson 2	
Activity 4	What Do You Already Know About the Effects of Gravity?
Activity 5	Forces

Lesson 3	
Activity 6	What Is Gravity?
Activity 7	The Force of Gravity
Activity 8	What Does Down Mean?

Lesson 4	
Activity 9	Pull and Gravity Around Us
Activity 10	Gravity and the Motion

Lesson 5	
Activity 11	The Revolving Planets
Activity 12	Record Evidence Like a Scientist: Gravity

Glossary

Concept (4.1)

Lesson (1)

Skydive	القفز بالمظلات	Force	القوة	Float	تطفو
Gravity	الجاذبية	Center	مركز	Distance	مسافة
Planets	الكواكب	Revolve	تدور	Mass	الكتلة
Orbits	مدارات	Slide	تنزلق	Crash	يتصادم

Lesson (2)

Motion	الحركة	Invisible	غير مرئية	Magnetism	المغناطيسية
Force	القوة	Attraction	الجذب	Astronauts	رواد الفضاء
Pull	السَّحب	Repulsion	التنافر	Friction	احتكاك
Push	الدفع	Magnet	مغناطيس	Wind	رياح

Lesson (3)

Tape	شريط لاصق	Scissors	مقص	Angle	زاوية
Protractor	منقلة	String	خيط (شريط)	Trail	محاولة
Suspend	يعلق	Horizontal	أفقي		

Lesson (4)

Iron	الحديد	Air resistance	مقاومة الهواء	Volumes	الحجم
Nickel	النيكل	Opposite	عكس	Hammer	المطرقة (الشاكوش)
Cobalt	الكوبالت	Invisible	غير مرئي	Speed	السرعة
Balance	الميزان	Feather	ريشة	Height	الارتفاع

Lesson (5)

Path	مسار	Orbit	مدار	Solar system	المجموعة الشمسية
Ellipse = oval	بيضاوي				

Lesson 1



Activity 1 Can You Explain?

» Observe the opposite figure, then choose:

The force that causes the skydiver to fall down to the ground is called ....

(magnetism - friction - gravity)

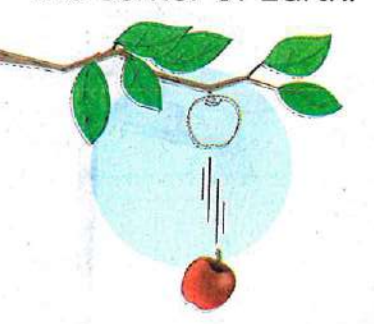


How does gravity affect the movement of objects



The gravity of the Earth

pulls objects with mass down toward the center of Earth.



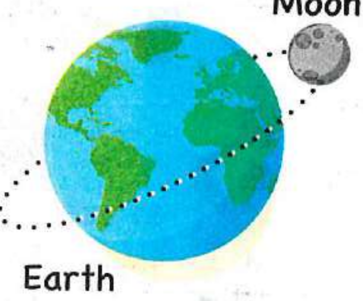
The gravity of the Sun

makes the planets revolve in fixed orbits around it.



The gravity of the moon

affects the ocean tides.



• كيف تؤثر الجاذبية في حركة الأجســـام؟

- قوة الجاذبية الأرضية تسحب الأجسام التي لها كتلة في اتجاه مركز الأرض.
- تتسبب قوة جاذبية الشمس في حركة الكواكب في مدارات ثابتة حول الشمس.
- تؤثر قوة جاذبية القمر على المد والجزر في المحيط.



It is the force of attraction between objects that have mass.

الجاذبية: هي قوة الجذب بين الأجسام التي لها كتلة.

Activity 2 Gravity

Look at the images; think what do they have in common?



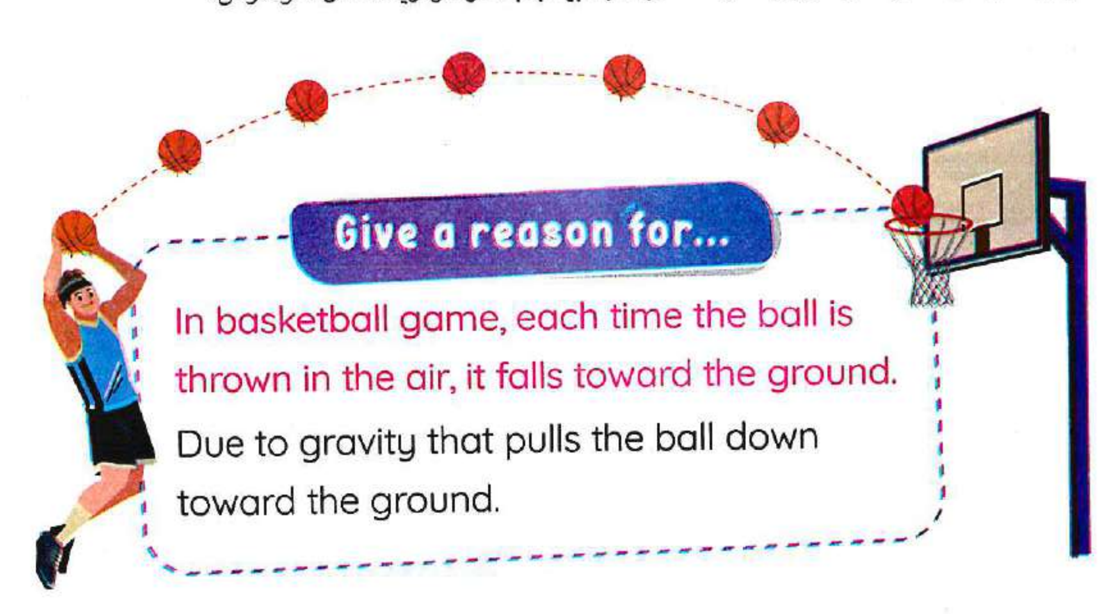
A boy on a bike falling down



Pouring oil

- Both images share the similarity of something going down toward the ground.
- Gravity pulls the boy and the oil down toward the ground.

• كلتا الصورتين تعبر عن السقوط من أعلى إلى أسفل. • قوة الجاذبية جذبت الولد والزيت لأسفل نحو الأرض.



Give a reason for...

In basketball game, each time the ball is thrown in the air, it falls toward the ground.

Due to gravity that pulls the ball down toward the ground.

Evaluate Your Learning!

Put (✓) or (✗):

1. If we throw an apple up in the air, it will fall down toward the ground due to gravity. ( )
2. We can't see the force of gravity, but we can feel its effect. ( )

Activity 3 Effect of Gravity on the Movement of Objects

» Gravity pulls all objects with mass toward the Earth's center.

A girl on a slide



The force of gravity pulls the girl toward the ground.

The Earth-Moon System



The moon revolves in a fixed orbit around the Earth due to the gravity of the Earth.

- تتسبَّب قوة الجاذبية في سحب البنت لأسفل نحو الأرض.
- يدور القمر حول الأرض في مدار ثابت، بفعل قوة جاذبية الأرض.

What would happen if... There were no gravity?

The girl would not be held on the slide.

The moon would float off into space.

- في حالة عدم وجود جاذبية، فإن البنت لن تستطيع الثبات على الزحلوقة.
- إذا انعدمت الجاذبية بين الأرض والقمر، سيسبح القمر في الفضاء.

Evaluate Your Learning!

» Put (✓) or (X):

1. Magnetism keeps the moon in its orbit around the Earth. ( )
2. Gravitational force causes objects to move downward. ( )
3. The moon revolves in a fixed orbit around the Earth due to the gravity of the Earth. ( )

Exercises on Lesson 1

Q1. Choose the correct answer:

1. The Earth's gravity .... objects towards its ....
   a. pushes - center b. pulls - poles c. pulls - center d. pushes - poles
2. .... revolves around the Earth in a fixed orbit due to the Earth's gravity.
   a. The Sun b. Mars c. Jupiter d. The moon
3. Gravity keeps the moon in a fixed orbit around .... (Alex. 2023 - Dakahlia 2024)
   a. the Sun b. the Earth c. itself d. another moon
4. The Earth attracts objects towards .... (Qalyobia 2024)
   a. its center b. the sky c. the moon d. the Sun
5. The gravity of .... affects the ocean tides on Earth. (Qalyobia 2024)
   a. Mars b. the moon c. Jupiter d. the Sun
6. If there is no Earth's gravity, the moon would .... (Cairo 2024)
   a. revolve faster around the Earth b. still orbit the Earth
   c. be attracted to the Earth d. float off into space

Q2. Put (✓) or (✗):

1. Earth's gravity causes skydivers to move downward. ( )
2. Gravity pulls objects towards the center of the Earth. (Alex. 2024) ( )
3. Ocean tides are affected by the gravity of the moon. (Cairo 2024) ( )
4. Without the Earth's gravity, the moon would float off into space. ( )
5. The Earth pulls objects towards its moon. (Giza 2024) ( )
6. Objects are pushed away from each other due to gravity. (Dakahlia 2024) ( )

Q3. Write the scientific term:

1. It is a force that pulls objects down towards the Earth's surface. (Minia 2023 - Alex. 2024) (..................)
2. It is the force of attraction between objects that have mass. (..................)
3. It is a phenomenon that takes place in oceans due to the gravity of the moon. (Cairo 2024) (..................)

Q4. Complete the following using the words between the brackets:

(moon – gravity – Earth – Sun – orbits)

1. The moon moves around the .... due to gravity. (Alex. 2024)
2. The gravity between the .... and planets makes the planets revolve in fixed .... in the solar system.
3. Objects move down from a high place towards the ground due to the effect of .... (Port Said 2024)
4. If Earth's gravity disappears, the .... will float off into space.

Q5. Correct the underlined words:

1. The gravity of the <u>Sun</u> affects the ocean tides. (Giza 2024) (....................)
2. Earth's gravity <u>pushes</u> objects downward. (....................)
3. A skydiver is attracted to the Earth's <u>sky</u>. (....................)

Q6. Give reasons for:

1. When you drop a pen, it falls down to the ground.

....

2. The force of gravity has an important role in the solar system. (Giza 2023)

....

Q7. What happens to:

1. The ball when it is thrown up into the air? (Damietta 2024)

....

2. The moon if there is no gravity between the moon and the Earth?

....

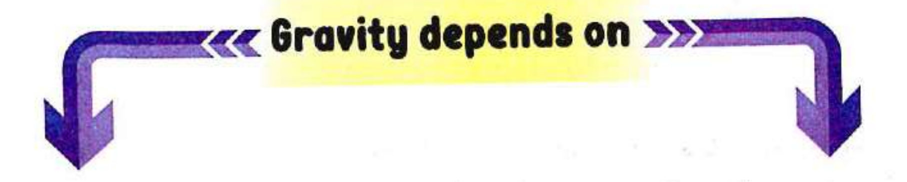
Lesson 2

Activity 4 What Do You Already Know About the Effects of Gravity?

- Gravity pulls objects toward the center of the Earth.
- Gravity affects two objects even when they don't touch each other, such as the gravity between the Earth and the moon.

• تسحب الجاذبية الأجسام في اتجاه مركز الأرض.

• يظل تأثير الجاذبية بين جسمين موجودًا حتى وإن لم يحدث بينهما تلامس مثل قوة الجذب بين الأرض والقمر.

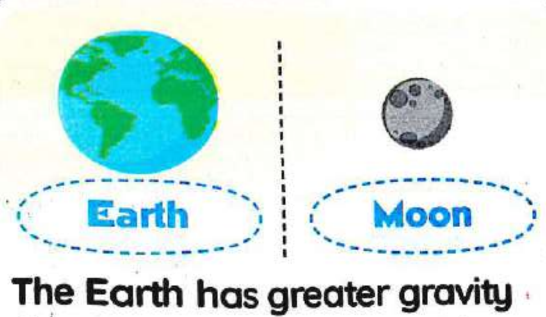


1 Mass:

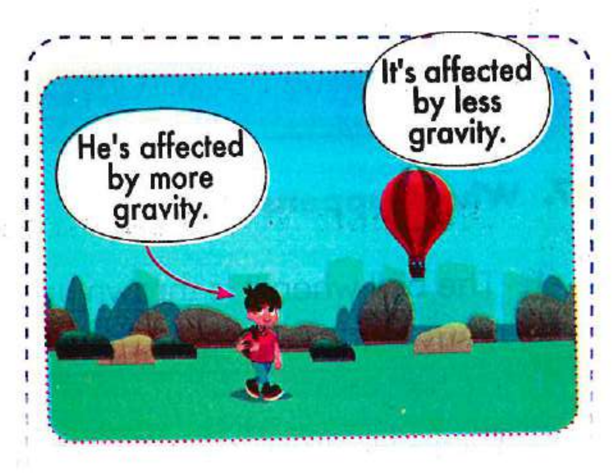
The gravitational force of an object increases when its mass increases and vice versa.

2 Distance:

The gravitational force increases when the distance between two objects decreases and vice versa.



The Earth has greater gravity than the moon because it has greater mass.



What happens if:

1 The mass of the moon becomes twice its real mass?

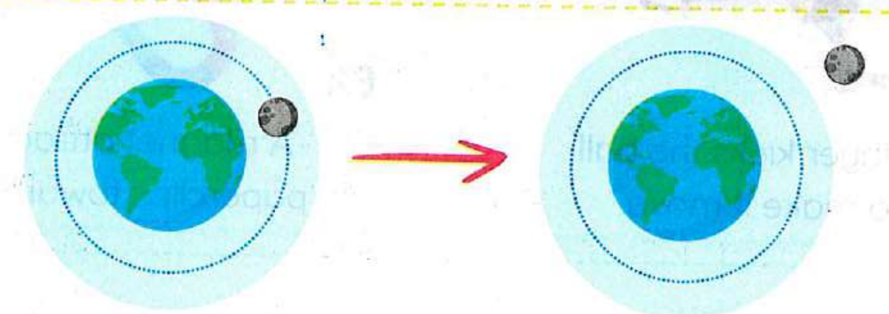


- The gravitational force between the Earth and the moon increases,
- The moon would be pulled closer to the Earth, and it might even crash into the Earth.

• إذا تضاعفت كتلة القمر، تزداد قوة الجاذبية بين الأرض والقمر؛ لذلك سوف يقترب أكثر من الأرض وقد يصطدم بها.

What happens if:

2 The distance between the moon and the Earth becomes twice?



- The gravitational attraction between them becomes smaller,
- The moon may float off into space.

• إذا تضاعفت المسافة بين القمر والأرض، تقل قوة الجاذبية بينهما، وقد يسبح القمر في الفضاء.



Evaluate Your Learning!

Put (✓) or (X):

1. The gravity of the moon is bigger than the gravity of the Earth. (   )
2. If the mass of an object increases, its gravitational force decreases. (   )

Activity 5 Forces

How do objects move?



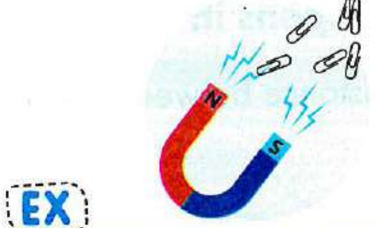
- Forces are needed to make things move.

Force: It is a pull or a push applied to an object.

Motion: It is the change of the object's position relative to another object.

Forces can affect objects in many different ways:

- **Forces can push or pull objects in different directions.**

Pushing Force	Or	Pulling Force
 EX: A player kicks the ball to make it move.		 EX: A magnet attracts paperclips toward it.

- **Forces can be weak or strong.**

Weak Force	Or	Strong Force
  EX: The pushing force needed to move a toy car		 EX: The pushing force needed to move a real car

Types of Forces

» The following examples show different types of forces.

1 Magnetism

- A magnet has a kind of invisible force that cannot be seen, called magnetism.

• المغناطيس له قوة غير مرئية (لا يمكن رؤيتها) تُسمى القوة المغناطيسية.

Magnetism

It is the force of attraction or repulsion between two magnets or between a magnet and an object.





A magnet can pull (attract) another magnet.

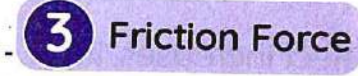


A magnet can push (repel) another magnet.

2 Gravity

- It pulls the apple toward the ground.

• تقوم قوة الجاذبية بسحب التفاحة إلى الأرض.



3 Friction Force

- Your foot exerts a force against the ground due to friction.

• تبذل قدمك قوة عند المشي؛ بسبب احتكاكها مع الأرض.



4 Wind Force

- It pushes the blades of wind turbines, so they move.

• تدفع قوة الرياح أذرع التوربينات وتتسبب في حركتها.



Force causes motion.

Motion is a result of force.

Exercises on Lesson 2

Q1. Choose the correct answer:

1. Gravitational attraction between two objects depends on the ....
   a. mass only
   b. distance only
   c. push force
   d. mass and distance

2. If the moon's mass is doubled, ...
   a. its distance away from the Earth is doubled
   b. the moon may collide with the Earth
   c. it floats off into space
   d. it goes away from the Earth

3. A table standing on the ground needs .... to move. (Alex. 2024)
   a. mass
   b. temperature
   c. height
   d. Force

4. The gravitational force of an object .... as its mass decreases. (Alex. 2024)
   a. increases
   b. decreases
   c. disappears
   d. doesn't change

5. As the mass of the object increases, its .... increases. (Cairo 2023)
   a. movement
   b. temperature
   c. gravity
   d. illumination

6. Magnetism is a kind of .... force. (Kafr El-Sheikh 2023 - Cairo 2024)
   a. attraction
   b. repulsion
   c. visible
   d. invisible

7. A person can exert a weak force to move .... (Giza 2023)
   a. a big truck
   b. a real car
   c. a very big rock
   d. a toy car

8. Magnetism is a kind of .... force. (Alex. 2024)
   a. repulsion
   b. attraction
   c. repulsion and attraction
   d. visible and invisible

9. You need to exert the greatest force to move ....

a. a magnet b. a real bike c. a book d. a real car

10. Wind turbines' blades move due to the ...... force of the ....

a. pull – gravity b. push – wind c. pull – wind d. push – gravity

Q2. Put (✓) or (✗):

1. A bird flying in the sky isn't affected by the Earth's gravity. ( )
2. There is no gravity between two objects that aren't in contact. ( )
3. Gravity depends on the object's mass and distance. (Sharkia 2024) ( )
4. A magnet can exert a pulling force only. (Giza - Qalyobia 2024) ( )
5. Gravity pulls objects toward the center of the Earth. (Sohag 2023) ( )
6. Magnetism is a force of pushing or pulling between two magnets. (Dakahlia 2023) ( )
7. A magnet has an invisible force called magnetism. ( )
8. As the mass of an object increases, its gravity increases. ( )

Q3. Write the scientific term:

1. It is a pull or push that is applied to an object. (Alex. 2024) (............)
2. It is a pulling force that causes objects to fall down toward the Earth. (Alex. 2024) (............)
3. It is a force that is found between two magnets or between the magnet and an object. (Menofia 2023) (............)

Q4 Correct the underlined words:

1. Heavy objects have <u>less</u> gravity than smaller objects. (............)
2. When two magnets repel, they <u>pull</u> each other. (............)
3. <u>Gravity</u> is a kind of repulsion and attraction forces. (Alex. 2024) (............)
4. Magnetism and gravitational force are <u>pushing</u> forces. (............)

Q5. Complete the following sentences:

1. A force may push or .... an object to make it move. (Giza 2023)
2. If the mass of the moon increases than its real mass, its gravitational attraction will .... (Giza 2023)
3. .... is a pull or push that is applied to an object. (Qalyobia 2024)
4. A person in a blimp flying in the sky is affected by .... gravitational force than a person standing on the ground.
5. The gravity of Earth is .... than that of the moon because Earth has a greater mass than the moon. (Sohag 2023)
6. A magnet can attract some objects by a force called .... (Luxor 2023)
7. The force between two magnets is called................ . (Alex. 2023)
8. An object at rest needs a .... to move. (Alex. 2023)
9. If the distance between the Earth and the moon decreases, the gravity between them will .... (Sharkia 2024)
10. The gravity of an object increases as its mass ....(Qalyobia 2024)

Q6. Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Kicking a ball	a. is a pull or a push that affects an object. (Alex. 2024)
2 A magnet attracting paperclips	b. is an example of a pushing force.
3 Force	c. is an example of a pulling force.

1 .... 2 .... 3 ....

Q7. Give reasons for:

1. The gravity between two objects depends on the distance between them. (Gharbia 2023)

   ....

2. Paperclips are pulled toward a magnet. (Qalyobia 2023)

   ....

3. The moon is attracted to the Earth. (Qalyobia 2024)

   ....

4. The gravity of the Earth is greater than the gravity of the moon. (Cairo 2024)

   ....

Q8. What happens if:

1. The distance between the Earth and the moon increases to its twice? (Cairo 2023)

   ....

2. The mass of the moon decreases to its half? (Cairo 2023)

   ....

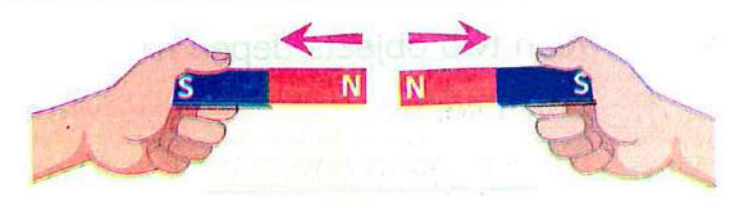
3. A magnet is placed near some paperclips? (Giza 2023)

   ....

4. The mass of the moon becomes twice its real mass? (Cairo 2023)

   ....

Q9. Study the following figure, then choose the correct answer:



1. The force shown in the previous figure is called ....
   a. gravity b. magnetism c. friction
2. These two magnets move away from each other by the effect of the .... force of the magnet.
   a. repulsion b. attraction c. garvity
3. When you leave magnet (A) from your hand, it falls toward the ground by the effect of the .... force.
   a. magnetism b. gravitational c. wind
4. If both magnets have equal masses, the Earth will pull them with .... force(s).
   a. equal b. unequal c. no correct answer

Q10. Which body does the Earth attract more: one with a mass of 100 kg or another with a mass of 400 kg? And why?

(Dakahlia 2024)

....

....



Activity 6 What Is Gravity?

Choose the correct answer:



An egg could slip out of your hand and fall to the floor due to the force of .... of the Earth, which .... the egg down.

a. gravity - pushes
b. magnetism - pulls
c. gravity - pulls
d. friction - pulls

Gravity on Earth

The force of gravity keeps us from floating into space like astronauts.

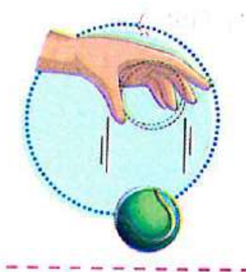


A man stands on the ground due to the presence of the Earth's gravity.

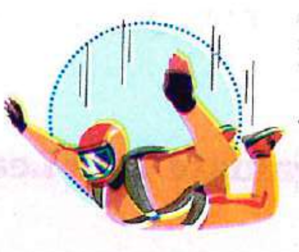


An astronaut floats into space due to the absence of gravity.

We can see the effect of gravity in action, such as when something falls.





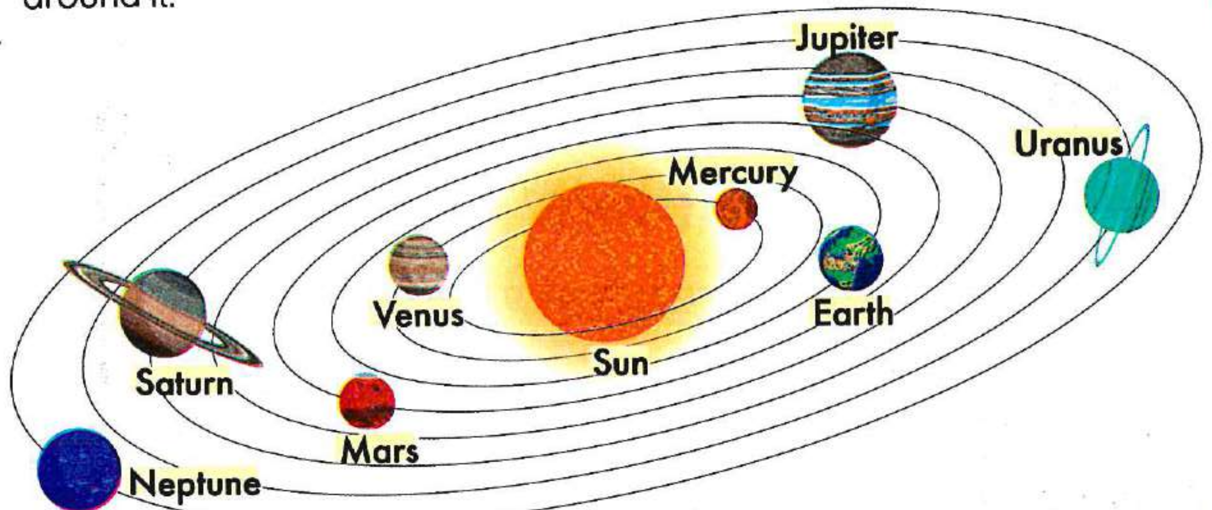


NOTE:

- Gravity doesn't only act on falling or moving objects but also acts on objects at rest, such as a book on a table.

Gravity in Space

- In space, there are large and small planets.
- Bigger planets have more gravity than that of smaller planets.
- The gravity of the Sun keeps the planets revolving in fixed orbits (paths) around it.



Solar System

- It contains the Sun and eight planets revolving around it.

NOTE:

- Like planets in the solar system, objects on Earth with big masses have more gravity than objects with small masses.

Evaluate Your Learning!

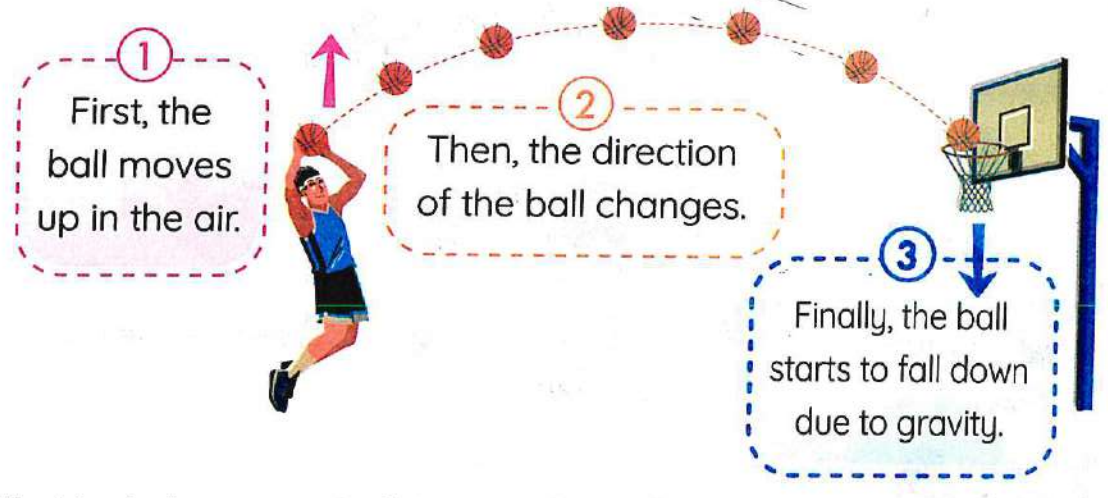
Put (✓) or (✗):

1. The skydiver floats in the air due to the absence of gravity. (   )
2. The Sun has the greatest gravitational force in the solar system. (   )
3. All objects float in the air due to the Earth's gravity. (   )

Activity 7 The Force of Gravity

What goes up must come down.

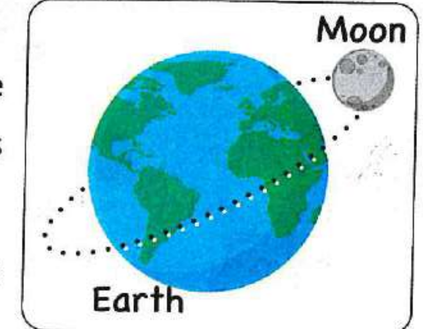
- Gravity changes the direction of anything you throw into the air.
- When you throw a ball into the air:



- All objects have gravity because they all have mass.
- Objects with greater mass exert greater force on objects around them.

Relation Between Gravity and Mass

- **In the Earth-and-moon system:**
  - The mass of the Earth is greater than the mass of the moon, so the Earth's gravity is greater than the moon's gravity.
  - The gravity of the moon also attracts the Earth toward the moon.



  - The moon stays in an orbit around the Earth due to the Earth's gravity.

Evaluate Your Learning!

Put (✓) or (✗):

1. Gravity affects the moving objects in motion only. (   )
2. The moon's gravity is less than the Earth's gravity. (   )



Unit 4

Activity 8 What Does Down Mean?

In this activity, we will investigate the angle at which an object is pulled toward the ground by the force of gravity.



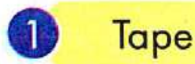
Experiment

Tools:

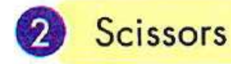








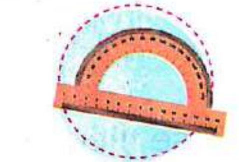
1 Tape



2 Scissors

3 Carpenter's level







4 Small weight

5 Protractor

6 Meterstick





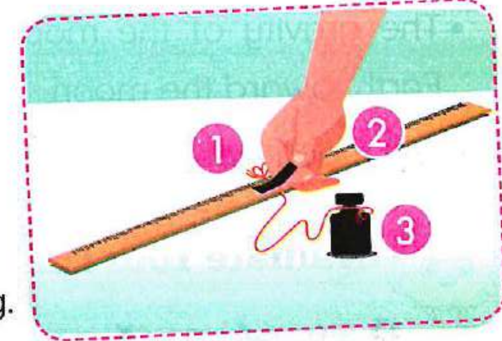


7 Several books

8 String

Steps:

1. Tie the string to the meterstick.
2. Use a piece of tape to fix the string in its place.
3. Attach the weight to the end of the string.

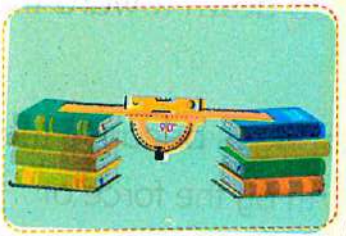


Metricstick	عصا مترية	Carpenter level	معيار الماء	String	خيط
Protractor	منقلة	Tape	شريط لاصق	Weight	ثقل

Trial 1

4 Suspend the meterstick horizontally between the books with the help of a carpenter level so that the string and the weight can move freely.

5 Measure the angle between the meterstick and the string.



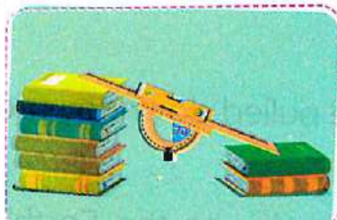
Observation:

When the meterstick is horizontal,
the angle between the meterstick and the string is 90°.
(Because gravity always pulls objects downward).

Trial 2

6 Use more books on the left side to tilt the meterstick up.

7 Measure the angle between the meterstick and the string using the protractor.



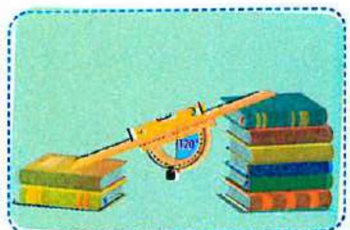
Observation:

When the meterstick is tilted upward,
the angle between the meterstick and the string is less than 90° (acute angle).

Trial 3

8 Move some books away from the left side to tilt the meterstick down.

9 Measure the angle between the meterstick and the string using the protractor.



Observation:

When the meterstick is tilted downward,
the angle between the meterstick and the string is more than 90° (obtuse angle).

» The factors that cause a change in the angle of measurement are:

1. The tilt of the meterstick up and down.
2. The movement of the string.

Conclusions:

» All objects on or near the Earth's surface are pulled down toward the center of the Earth.

» As the tilt of the meterstick changes, the angle changes because the weight is always pulled toward the center of the Earth by the force of gravity.

• جميع الأشياء التي تقع على سطح الأرض أو قريبة منه تنجذب للأسفل نحو مركز الأرض.

• مع تغير ميل العصا المترية تتغير الزاوية؛ لأن الوزن ينجذب دائمًا نحو مركز الأرض بقوة الجاذبية.

Evaluate Your Learning!

» Put (✓) or (✗):

1. All objects on or near the Earth's surface are pulled down toward the center of the Earth. ( )
2. The direction of an object may be changed due to the Earth's gravity. ( )
3. The Earth's gravity is a repulsion force that pulls all objects down toward its center. ( )

Exercises on Lesson 3

Q1. Choose the correct answer:

1. .... force acts on all objects on Earth.
   a. Gravity b. Speed c. Electric d. Magnetism
2. Gravity depends on the .... of a body. (Beni Suef 2023)
   a. speed b. mass c. length d. age
3. Gravity is the .... force between objects that have ....
   a. repulsion - mass b. attraction - mass
   c. attraction - speed d. pushing - speed
4. In the solar system, planets stay in their orbits due to the gravity of ....
   a. the moon b. the Sun c. Mars d. the Earth
5. Gravity can change the .... of a moving object.
   a. mass b. color c. volume d. direction
6. Astronauts float in space due to the absence of ....
   a. magnetism b. mass c. gravity d. speed
7. The moon has greater gravity than that of ....
   a. Earth only b. the Sun
   c. a magnet d. the Earth and the Sun
8. Which statement describes the Earth-moon-system?
   a. Earth's gravity is less than that of the moon.
   b. The moon never attracts the Earth toward it.
   c. The moon's mass is greater than that of the Earth.
   d. Both the Earth and the moon have gravitational force.
9. When you throw an object vertically upwards, it ....
   a. moves fast towards space
   b. suspends in the air because its gravity is equal to that of the Earth
   c. returns again to the Earth under the effect of gravity
   d. floats in space because there is no gravity

Q2. Put (✓) or (✗):

1. Any object that has mass has gravity. ( )
2. A book on a table isn't affected by gravity. ( )
3. Gravity only affects objects in motion. (Qalyobia 2024) ( )
4. Gravity doesn't change the direction of an object thrown up in the air. ( )
5. Bigger planets have more gravity than small planets. ( )
6. All objects are pulled toward the ground due to the effect of gravity. (Cairo 2023) ( )
7. The moon stays in a fixed orbit around the Earth due to the gravity between them. (Cairo 2023) ( )
8. Without the gravity of the Sun, the planets would float off into space. (Giza - Gharbia 2024) ( )

Q3. Write the scientific term:

- It is the force of attraction that exits between objects that have mass. (..................)

Q4. Complete the following sentences:

1. Any object has .... depending on its mass. (Alex. 2023)
2. The gravity of the moon is .... than the gravity of the Earth. (Kafr El-Sheikh 2024)
3. The direction of the Earth's gravity is always toward the .... of the Earth. (Alex. 2023)
4. Gravity pulls objects toward the .... of the Earth. (Sohag 2023)
5. The force of gravity is always a .... force, and it changes the .... of movement. (Alex. 2023)

Q5. Correct the underlined words:

1. Astronauts float in space due to the absence of magnetism. (..................)
2. When a ball thrown in the air moves back toward the ground, its mass changes. (..................)
3. The mass of the moon is greater than that of the Earth. (..................)

Q6. Give reasons for:

1. Astronauts float into space.

....

2. You always land on the ground when you jump up. (Luxor 2023)

....

3. The moon's gravity is less than the Earth's gravity. (Sharkia 2024)

....

Q7. What happens if:

1. You throw a basketball into the air? (El-Gharbia 2023)

....

2. The gravity on Earth vanishes?

....

3. The gravity between the Sun and the planets of the solar system is absent? (Alex. 2023)

....

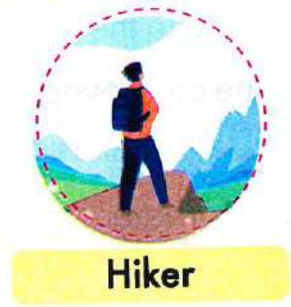
Q8. Look at the following figure, then complete:

1. The .... has the largest mass.
2. The .... has the lowest force of gravity.

Unit 4

Q9. Study the following figures, then put (✓) or (✗):

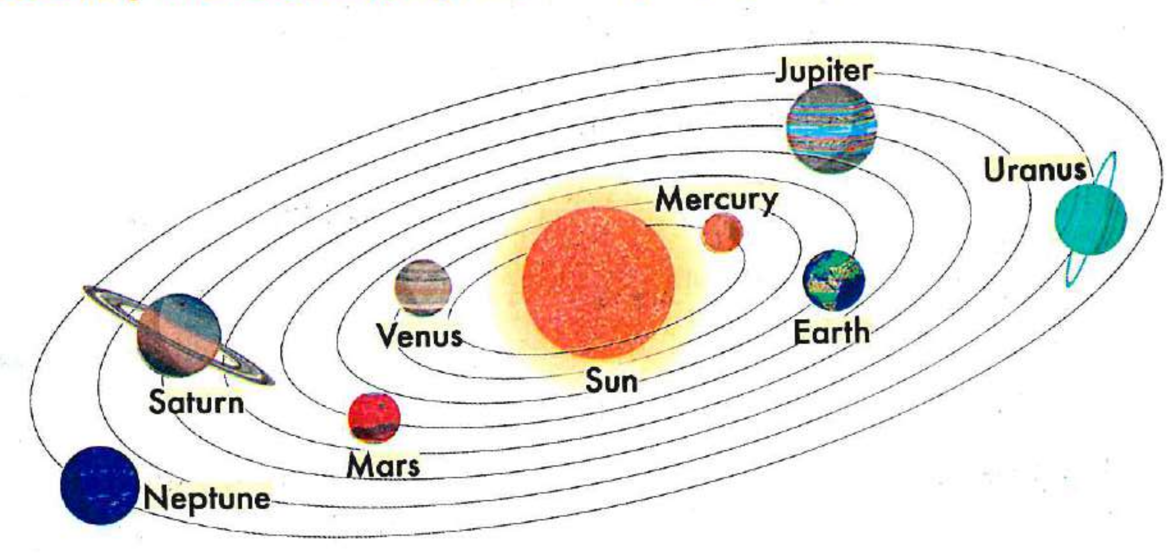






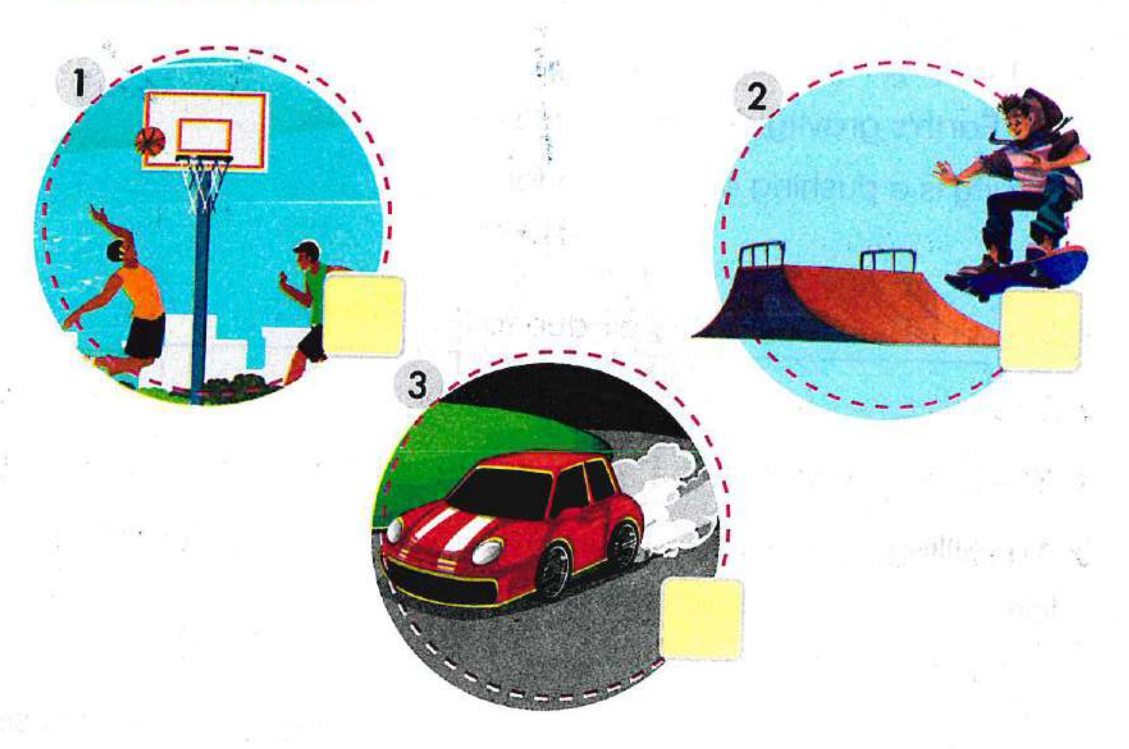
1. The skydiver floats in the air due to the absence of gravity. ( )
2. The astronaut floats in space due to the presence of gravity. ( )
3. The hiker can stand on the ground due to the moon's gravity. ( )
4. The hiker and the skydiver are affected by the Earth's gravity. ( )

Q10. Study the following figure, then put (✓) or (✗):



1. The Sun has the biggest gravitational force in the solar system. ( )
2. The gravity of Mercury is greater than the gravity of Jupiter. ( )
3. If the Sun's gravity disappears, the planets will stay in their orbits. ( )

Q11. In the figures below, check the one where gravity changes the object's direction:



Q12. Study the following figures, then choose the correct answer:







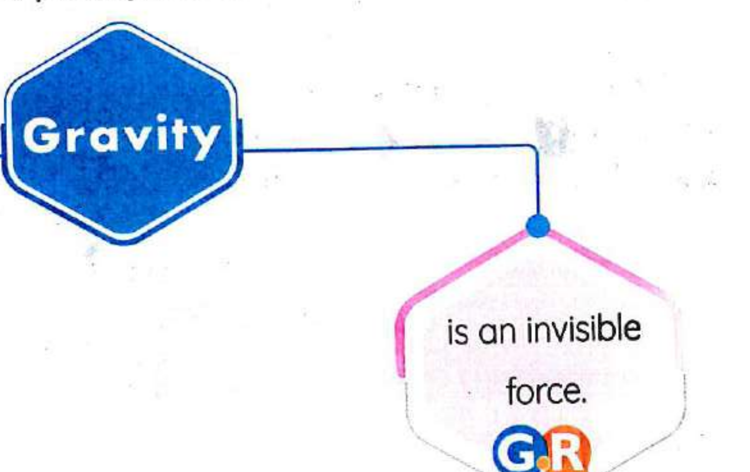
1. Angle "L" equals .... (60° – 90°) due to the force of .... (magnetism – gravity).
2. Angle "Y" may be equal to .... (80° – 90°).
3. Angle "Z" may be equal to .... (90° – 110°).

Lesson 4

Activity 8 Pull and Gravity Around Us

» Put (✓) or (✗):

1. The Earth's gravity doesn't affect static objects. ( )
2. Gravity is a pushing or a pulling force. ( )



Because we can't see it, but we can see its effects around us everywhere.

NOTE:

- Objects with more mass pull objects with less mass toward them.

Effects of Gravity in Space



» The Sun pulls all planets toward it.

» The planets revolve in fixed orbits around the Sun due to the Sun's gravity.

Effects of Gravity on Earth





On Earth, gravity pulls everything on or near the Earth's surface toward the center of the Earth.

- The Earth's gravity holds living organisms, bodies of water, and rocks, ... etc.) on the ground.
- Gravity keeps our atmosphere around the Earth.

Magnetism

- is a pulling or pushing force.
- is an invisible force.

A magnet attracts some metals, such as iron, steel, nickel, and cobalt.

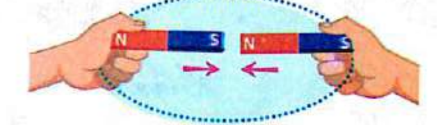
Examples:

A magnet can attract iron nails due to its pulling force on them.	A magnet can attract (pull) another magnet.

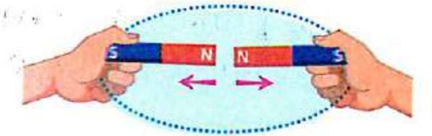
A magnet can attract iron nails due to its pulling force on them.



A magnet can attract (pull) another magnet.



A magnet can repel (push) another magnet.



Friction

- Friction is a force that arises between **two touching surfaces**.
- Friction **slows** the movement of objects.
- Friction acts in an **opposite** direction to the object's motion.

• قوة الاحتكاك تظهر دائمًا بين جسمين متلامسين.

• تقوم قوة الاحتكاك بتقليل سرعة الأجسام.

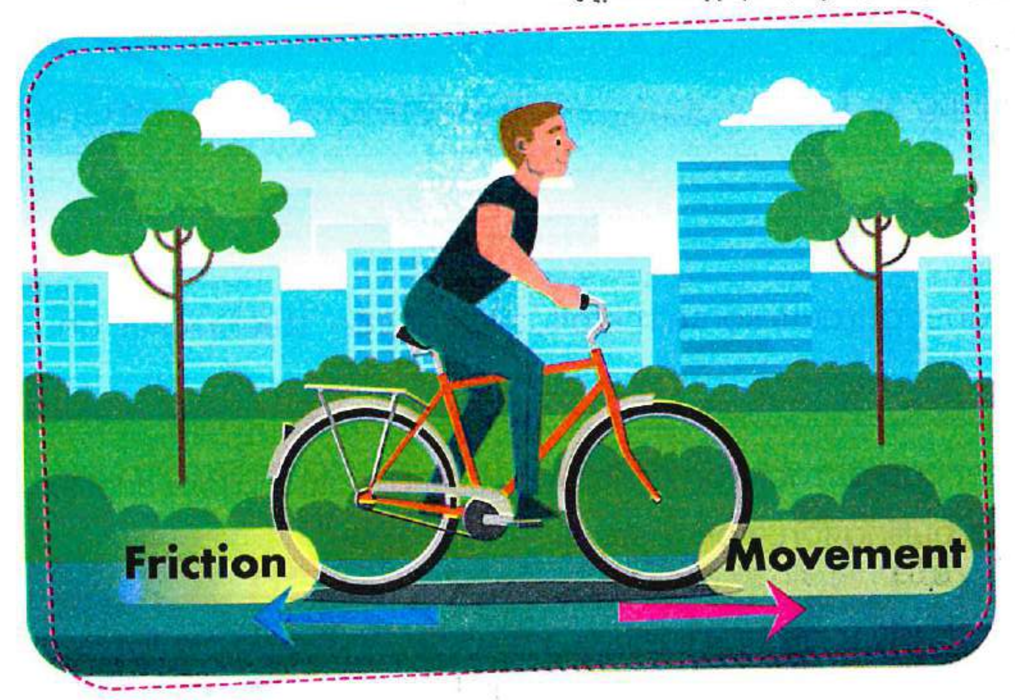
• تؤثر قوة الاحتكاك في اتجاه معاكس لاتجاه حركة الجسم.

Friction: It is a force that opposes the motion of a body across a solid surface or through a gas or liquid.

Example:

- A bicycle brake pulls back the movement of the tires by creating friction between the brake and the tires.

• فرامل الدرَّاجة تعرقل حركة الإطارات؛ بسبب الاحتكاك بينهما.





Your bike will stop when you stop pedaling.

Due to the friction force that slows down the bike until it stops.

Air Resistance

- Air resistance is a type of friction force.
- Air resistance always acts against gravity.

Air Resistance: It is a force that opposes the movement of an object as it passes through air.

Example:

1. Skydivers release (opens) his parachute.
2. Parachutes gets filled with air, creating air resistance.
3. The air resistance pulls the skydivers backward and slows their fall to the Earth's surface.



- يحرر هواة القفز بالمظلات أربطة المظلات لإبطاء سرعة هبوطهم.
- تحتجز المظلات الهواء المتدفق إلى أعلى؛ مما يسبب مقاومة الهواء.
- تقوم مقاومة الهواء بسحب الشخص في عكس اتجاه الجاذبية فتبطئ من سرعة سقوطه على سطح الأرض.



Skydivers open their parachutes during landing.
To slow down their fall (drop) to the Earth 's surface.

Evaluate Your Learning!

Put (✓) or (X):

1. Skydivers open their parachutes during landing to increase their speed. ( )
2. Earth pulls living organisms only toward its center. ( )

Unit 4

Activity 10 Gravity and the Motion

In this activity, we will investigate the effect of gravity and air resistance on different objects.

Tools:






1. Paperclip
2. Feather
3. Plastic ball (with holes)
4. Plastic ball (without holes)

Steps - Part 1



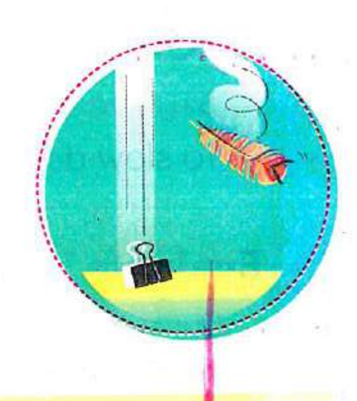


1. Stand on a chair.
2. Drop the feather and the paperclip at the same time.
3. Observe which one reaches the ground first.

Observation:

- The paperclip reaches the ground before the feather.

•مشبك الورق يصل إلى الأرض قبل الريشة.



Conclusion:

- The feather took longer time to reach the floor because its surface area is larger than that of the paperclip, so the feather is affected by air resistance more than the paperclip.

Steps - Part 2



1. Stand on a chair.



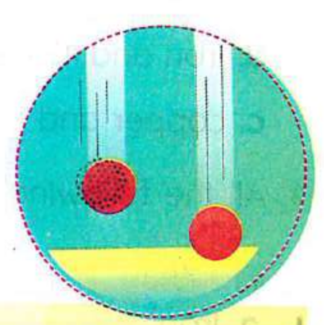
2. Drop the two balls at the same time from the same height.



3. Observe which one reaches the ground first.

Observation:

- The ball without holes reaches the ground before the ball with holes
- الكرة المصمتة تصل إلى الأرض قبل الكرة ذات الثقوب.



Conclusion:

- The plastic ball with holes took longer time to reach the floor because it was slowed down by the upward-flowing air that passes through the holes and causes the increase of the air resistance affecting it.

» Air resistance is a factor that can slow down falling objects.

» As the surface area of the object increases, the air resistance that acts on it increases.

Imagine that there is no air resistance on Earth:
All bodies will reach the ground at the same time because the force of gravity is constant and acts on all bodies in the same way.



Law of Motion The force of gravity is constant and acts on all objects in the same way.

Exercises on Lesson 4

Q1. Choose the correct answer:

1. A force created between two attached surfaces that leads to slowing the movement is called .... force. (Cairo 2023)
   a. pushing b. dragging c. friction d. pulling

2. The materials that are attracted to magnets are .... (Dakahlia - Damietta 2024)
   a. iron and nickel b. aluminum and copper
   c. copper and silver d. silver and gold

3. All the following materials are attracted to magnets, except .... (Giza 2023 - Gharbia 2024)
   a. iron b. nickel c. wood d. cobalt

4. Friction force .... the movement of objects. (Alex. 2024)
   a. slows down b. increases
   c. speeds up d. doesn't affect

5. .... is considered a type of friction force. (Sohag 2023)
   a. Air resistance b. Magnetism
   c. Gravity d. Electrical force

6. A parachute in the air is affected by .... and ....
   a. magnetism – gravity b. water resistance – gravity
   c. gravity – air resistance d. air resistance – magnetism

7. .... is a factor that acts against the gravity force. (Demietta 2023)
   a. Magnetism b. The mass of an object
   c. Air resistance d. The shape of an object

8 If a skydiver opens his parachute when landing, his speed will ....

a. become zero
b. decrease
c. not be affected
d. increase

Air resistance
Gravity

9 Which situation shows the effect of friction force?

a. An iron nail is pulled to a magnet.
b. The Sun pulls the Earth towards it.
c. The air pulls a parachute backward.
d. A magnet pushes another magnet away.

10 The friction force between objects usually acts on slowing down their motion because firction force .... (Cairo 2023)

a. acts in the same direction of their motion
b. acts with their motion in their strength and direction
c. acts in an opposite direction to their motion
d. increases their motion in the opposite direction

11 Which statement is true if you drop a bowling ball and a feather in the absence of air resistance?

a. The feather reaches the ground first.
b. The bowling ball is affected by more air resistance.
c. Both of them will reach the ground at the same time.
d. The feather takes longer time to reach the ground.

12 Which one of the following is affected by more air resistance when dropping them from the same height?

a. An iron nail
b. A feather
c. A hammer
d. A wooden cube

Q2. Put (✓) or (✗):

1 Earth pulls living organisms only towards its center. (Giza 2023) ( )

2 Two magnets move away from each other when there is a repulsion force between them. ( )

3. Air resistance is a factor that speeds up the falling objects toward the Earth. (Cairo 2023) (   )
4. Air resistance is a type of friction force that can be seen easily. (Behiera 2024) (   )
5. The pulling force of a magnet attracts materials made of iron. (   )
6. A magnet has the force of attracting some metals, such as silver and gold. (   )
7. Air resistance pulls a skydiver down towards the ground. (   )
8. The air resistance opposes the movement of objects through air. (   )
9. Both gravity and air resistance act in opposite directions to each other. (   )
10. If there is no air resistance, all objects fall to the ground at the same speed. (   )

Q3. Write the scientific term:

1. It is a force between two objects in contact with each other, and it acts in the opposite direction of the movement. (Alex. 2023) (..................)
2. It is an invisible force that attracts iron paperclips to the magnet. (Alex. 2023) (..................)
3. It is a force that slows down a moving object and opposes its motion. (Alex. 2024) (..................)
4. It is a type of friction force that slows down the falling of objects in the air. (..................)
5. It is the force that causes skydivers to move downward. (..................)
6. It is a tool that skydivers use to slow their drop to the Earth's surface. (..................)

7 It is the law which states that the force of gravity is constant and acts on all objects in the same way. (El-Gharbia 2023) (..................)

Q4. Correct the underlined words:

1 Friction force <u>speeds up</u> the movement of the object. (..................)

2 <u>Gravity</u> is the force that pulls objects made of iron to the magnet. (..................)

3 <u>Gravity</u> is a type of friction force. (..................)

4 <u>Magnetism</u> force opposes the motion of the body and slows down its speed. (Cairo 2023) (..................)

Q5. Complete the following sentences:

1 When a boy moves down a slide, this is due to the force of .... (Cairo 2023)

2 The force of .... slows down an object's motion. (Sharkia 2024)

3 Air resistance is a type of .... force. (Cairo 2023)

4 A magnet can attract some objects by a force called .... (Luxor 2023)

5 The force that opposes the movement of objects as they pass through air is called ....

6 The force that originates between two touching surfaces and causes a slowdown in the object's motion is called .... (Dakahlia 2024)

7 Friction force acts in the .... direction of the object's movement.

8 When pressing the bicycle brake, the bicycle stops due to the .... force between its brake and tires.

9 A parachute in the air is affected by some forces, such as gravity and .... force. (Alex. 2024)

10 The law of motion states that the force of gravity is .... and acts on all objects in the same way.

11. Air resistance .... a skydiver backward against the Earth's ....

Q6. Cross out the odd word:

1. Air resistance – Friction – Magnetism – The Sun (Cairo 2024) (..................)
2. Nickel – Cobalt – Wood – Iron (Cairo 2023) (..................)

Q7. Give reasons for:

1. Paperclips are pulled towards the magnet. (Qalyobia 2023)

....

2. Your bike will stop when you stop pedaling.

....

3. The skydiver opens his parachute during landing. (Kafr El-Sheikh 2023)

....

4. Air resistance affects the movement of an object that falls from a height. (Beni Suef 2023)

....

5. A feather takes a longer time than a paperclip to reach the ground if both are dropped from the same height.

....

Q8. What happens if:

1. You approach a magnet to a mixture of sand and iron nails?

....

2. A skydiver opens his parachute during landing?
(According to his speed) (Luxor 2023

....

3. You press the brakes on your bike?

....

4. A metal ball and a feather are dropped from a tower? (Giza 2023

....

5 You drop a hammer and a feather from the same height and there is no air resistance on Earth?

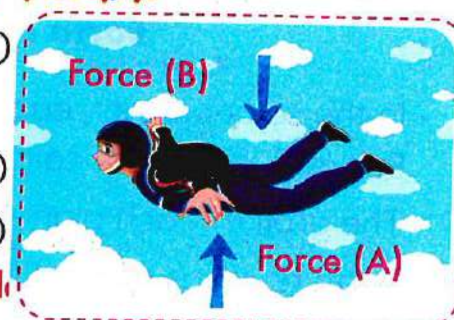
....

Q9. Study the following figure, then put (✓) or (✗):

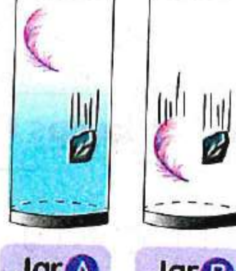
1 Force (B) is a type of friction force. (   )

2 Force (A) slows down the drop of the skydiver. (   )

3 Force (B) is always a pulling force. (   )



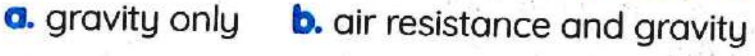
Q10. Imagine that jar (A) contains air, whil
air, then choose the correct answer:



1 The two bodies in jar (A) are affected by .... (Alex. 2023)

a. gravity only   b. air resistance and gravity

2 The two bodies in jar (B) are affected by .... (Alex. 2023)



a. gravity only   b. air resistance and gravity

3 In jar (A), the rock is pulled with ....

a. more gravity than the feather

b. the same gravity by which the feather is pulled

4 In jar (A), if the feather takes 10 seconds to reach the ground, the rock may take .... to reach the ground.

a. 15 seconds   b. 8 seconds

Lesson 5

Activity 11 The Revolving Planets

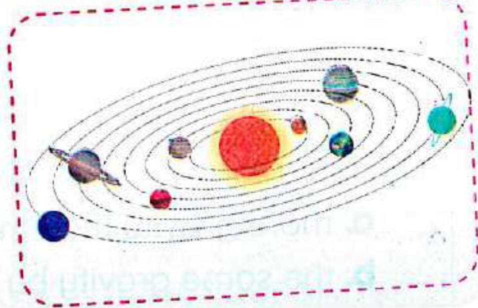
In 1543, a scientist called Nicolaus Copernicus stated that Earth revolves around the Sun.



- In the solar system, each planet revolves around the Sun in a fixed path called an orbit.
- The orbit of each planet has an elliptical (oval) shape.
- Earth revolves around the Sun at a speed that nearly equals 107,000 km per hour.

في عام 1543، ذكر نيكولاس كوبرنيكوس أن الأرض تدور حول الشمس.
- في النظام الشمسي، يدور كل كوكب حول الشمس في مسار محدد يُطلق عليه المدار.
- المدار: عبارة عن دائرة مفلطحة أو شكل بيضاوي.
- يدور كوكب الأرض حول الشمس بسرعة 107,000 كم في الساعة.

What keeps the planets revolving around the Sun in fixed orbits?



- The great gravitational pulling force of the Sun keeps the planets revolving in fixed orbits around it.

ما الذي يجعل الكواكب تدور في مدارات ثابتة حول الشمس؟
- قوة جاذبية الشمس القوية تحافظ على بقاء الكواكب في مدارات ثابتة حولها.

What happens if:

The gravity of the Sun disappears?

All planets float off into space and leave their orbits around the Sun



The Sun is considered the center of motion in the solar system.
Because the Sun has the greatest mass in the solar system, so it has the greatest gravity, which makes all planets revolve around it in fixed orbits.

Activity 12 Record Evidence Like a Scientist: Gravity

» In this concept, you have learned about the effects of gravity.

» Now, try to think like a scientist by writing your claim, evidence, and scientific explanation about one of the main points of this concept through the four steps you have learned in the first concept.



Question:

» How does gravity affect the movement of objects?

My Claim:

» ....

....

Evidence:

» ....

....

Scientific Explanation with Reasoning:

» ....

....

Exercises on Lesson 5

Q1. Choose the correct answer:

1. The center of the solar system is .... (Behiera 2024)
   a. the Sun   b. Mars   c. the Earth   d. the moon
2. .... stated that the Earth revolves around the Sun.
   a. Newton   b. Einstein   c. Galileo   d. Copernicus
3. The orbit that each planet revolves in around the Sun has .... shape.
   a. a circular   b. an oval
   c. a zigzag   d. a rectangular
4. The solar system consists of ....
   a. the Sun and moon only   b. the Sun and a group of planets
   c. the Sun and Earth only   d. a group of planets only
5. Earth revolves around the Sun at a speed that nearly equals ....
   a. 107,000 m per second   b. 107,000 km per hour
   c. 1,070 km per hour   d. 1,070 m per second
6. The force of .... keeps the planets in their paths around the Sun. (Cairo 2023)
   a. air resistance   b. friction   c. gravity   d. electricity

Q2. Put (✓) or (✗):

1. Nicolaus Copernicus stated that Earth revolves around the moon. (   )
2. Without the gravity of the Sun, the planets would float off into space. (Giza - Gharbia 2024) (   )
3. The Sun is located in the center of our solar system. (   )
4. The Sun revolves around the Earth. (Cairo 2024) (   )
5. The Earth's gravity keeps all planets in their orbits. (   )
6. The orbit of each planet has an elliptical shape. (   )

7. All planets revolve around the Sun in fixed circular orbits at the same speed. ( )

Q3. Write the scientific term:

1. He is a scientist who proved that the Sun is the center of our solar system. (El-Gharbia 2023) (..................)
2. It is the force that holds all planets in their orbits around the Sun. (..................)
3. It is a fixed path where planets revolve around the Sun. (..................)

Q4. Complete the following using the words between the brackets:

(an elliptical – gravity – Sun – orbits)

1. The solar system includes the .... at its center, with eight planets orbiting around it.
2. The force that keeps all planets around the Sun is called .... (Beheira 2023)
3. Earth revolves around the Sun in a fixed path that has .... shape. (Alex. 2023)
4. In the solar system, all planets revolve in fixed paths called .... (Beheira 2024)

Q5. Give reasons for:

1. The Sun is considered the center of motion of the solar system.

....

2. Planets revolve around the Sun in fixed orbits.

....

Q6. What happens if:

- The gravity of the Sun disappears?

....


Concept 4.2
Patterns of Motion in the Sky
12
9
3
6

Concept 2

Patterns of Motion in the Sky

Lesson 1	
Activity 1	Can You Explain?
Activity 2	Day and Night
Activity 3	What Do You Already Know About Patterns of Motion in the Sky?

Lesson 2	
Activity 4	Rotation
Activity 5	Sunrise

Lesson 3	
Activity 6	Effects of Earth's Rotation
Activity 7	What Can Shadows Tell Us?
Activity 8	Constellations Visible During Different Seasons

Lesson 4	
Activity 9	Constellations
Activity 10	Phases of the Moon

Lesson 5	
Activity 11	What Are Stars?
Activity 12	How Do We Study the Stars?

Lesson 6	
Activity 13	Record Evidence Like a Scientist: Day and Night
Activity 14	Planetarium Director and the Stars

Glossary

Concept (4.2)

Lesson (1)

Stars نجوم	Shadow ظل	Regular منتظم	Imaginary تخيلي
Cycle دورة	Rotation دوران	North pole القطب الشمالي	South pole القطب الجنوبي
Spins = rotate يدور	Phenomenon ظاهرة		

Lesson (2)

Center of the Earth مركز الأرض	Elliptical orbits مدارات بيضاوية	Counterclockwise عكس عقارب الساعة	Slightly قليلا
Vertical axis محور رأسي	Length of day طول اليوم	Tilted مائل	Sunset غروب الشمس
Sunrise شروق الشمس			

Lesson (3)

Rise تشرق	Clay صلصال	Set تغرب	Shifts تتحرك
Cardstock ورق مقوى	Constellations تجمع نجمي	Thousands آلاف	
Mythical hunter صياد أسطوري	Straw شفاطة بلاستيكية	Compass بوصلة	

Lesson (4)

Bright تتوهج	First quarter تربيع أول	Reflect تعكس	Second quarter تربيع ثانٍ
Seasons فصول	First gibbous أحدب أول	Polaris النجم القطبي	Second gibbous أحدب ثانٍ
Hijri month شهر هجري	Full moon البدر	Lunar month الشهر القمري	New moon محاق
First crescent هلال أول	Illuminated مضيء	Second crescent هلال ثانٍ	Darkened مظلم

Lesson (5)

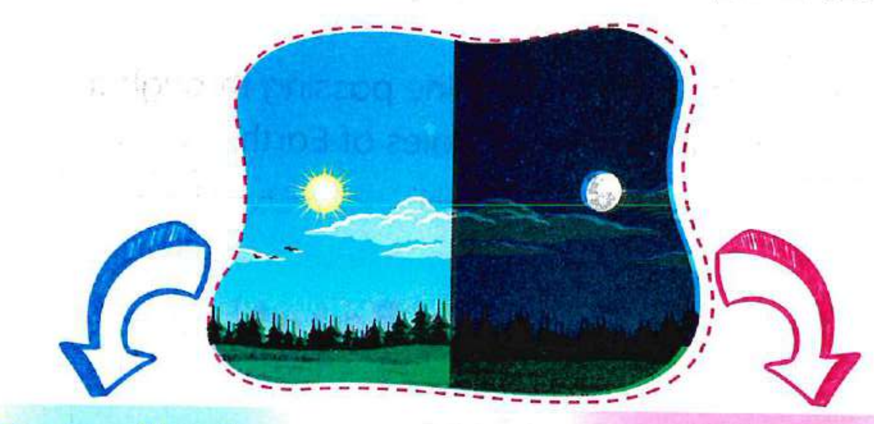
Giant عملاقة	Life continuity استمرارية الحياة	Superhot gases شديدة الانفجار	Proved أثبت
Hydrogen غاز الهيدروجين	Matter المادة	Helium غاز الهيليوم	Universe الكون

Lesson 1

Activity 1 Can You Explain?

» You can observe the cycle of day and night every day.

• يمكنك ملاحظة تعاقب الليل والنهار كل يوم.



During the day

• You can observe shadows of objects move.

• يمكنك ملاحظة تغيُّر موقع الظل.

During the night

• You can observe the moon and some stars appear to move across the sky.

• يمكنك رؤية القمر، وبعض النجوم تظهر كأنها تتحرك في السماء.

Earth's rotation around its axis causes:

North Pole
Axis
South Pole

1. The regular pattern of day and night.
   تعاقب الليل والنهار.
2. The movement of objects' shadows throughout the day.
   تحرُّك الظل خلال النهار.
3. The Sun, planets, and stars appear to move across the sky.
   رؤية الشمس والكواكب والنجوم تتحرَّك في السماء.

Activity 2 Day and Night

- Earth rotates (spins) all the time.
- Earth takes a whole day (24 hours) to make one complete turn on its axis.
- The apparent motion of the Sun is due to the Earth's rotation on its axis.

• تدور الأرض طوال الوقت حول محورها.

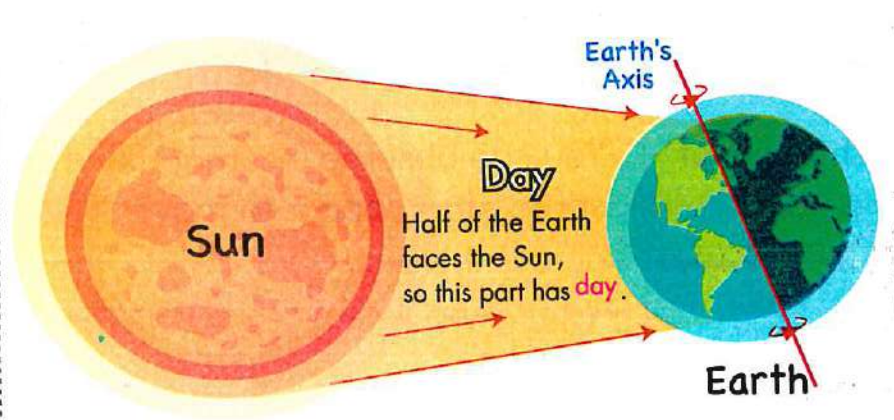
• تستغرق الأرض يومًا كاملًا (24 ساعة) لتقوم بدوران كامل حول محورها.

• تحدث الحركة الظاهرية للشمس؛ بسبب دوران الأرض حول محورها.

Earth's axis: It is an imaginary line passing through the North and South Poles of Earth.

محور الأرض: هو خط افتراضي (تخيلي) يمر من القطب الشمالي إلى القطب الجنوبي.

During Earth's Rotation



Night
The other half of the Earth that faces away from the Sun doesn't receive any light, so this part has night.

We cannot feel the Earth spinning, but we know that from the regular pattern of day and night.



Evaluate Your Learning!

Put (✓) or (✗):

- The regular pattern of day and night happens due to Earth's rotation on its axis. ( )

Concept 2

Activity 3 What Do You Already Know About Patterns of Motion in the Sky?

- The Sun appears to change its position in the sky during the day.
- The Sun rises in the east and sets in the west.

Imagine that you are facing the north direction of the Earth

In the early morning
(The Sun rises in the east.)



The Sun would be to your right.

At noon
(The Sun is in the center of the sky.)



The Sun would be above your head..

In the late afternoon
(The Sun sets in the west.)



The Sun would be to your left.

If you change your direction, facing the north or the south, the Sun will always rise in the east and set in the west.

Evaluate Your Learning!

- ***Adam took different pictures during the day of a tree that is located in the north direction of the Earth. Complete the following sentences using the words from the brackets:***

(10 a.m. – 12 p.m. – 2 p.m.)

1. Picture (a) was taken at ....
2. Picture (b) was taken at ....

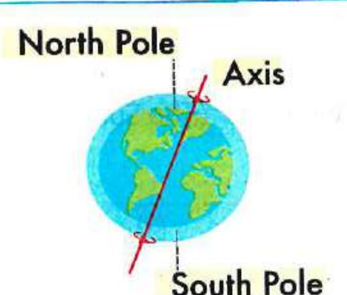
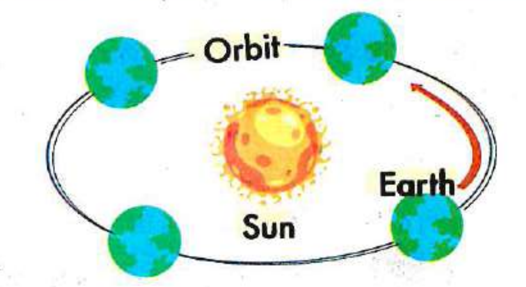








Rotation or Revolution

Rotation	Revolution
• It is the spinning of an object around its axis. •هو دوران الجسم حول محوره.	• It is the orbiting of an object around another object. •هو دوران الجسم في مسار حول جسم آخر.
	

Examples

• Earth rotates on its axis once every day.	• Earth revolves around the Sun in an orbit.

• An axis is an imaginary line that runs through the center of an object.

•المحور هو خط افتراضي يمر بمركز جسم ما.

• An orbit is an imaginary path where an object revolves around another object.

•المدار هو مسار تخيلي يدور فيه الجسم حول جسم آخر.

Evaluate Your Learning!

Complete the following sentences using the words in brackets:

1. Earth (revolves - rotates) on its axis once every (24 hours - year).
2. Earth (revolves - rotates) around the Sun in a fixed orbit

Exercises on Lesson 1

Q1. Choose the correct answer:

1. Day and night phenomenon occurs due to the rotation of the Earth around .... (Cairo /Qalyobia 2024)

   a. the Sun b. the moon
   c. the solar system d. its axis

2. The Earth rotates on its axis once every .... hours. (Dakahlia 2024)

   a. 24 days b. 24 hours c. 365 days d. 365 hours

3. If one part of the Earth receives sunlight for 14 hours a day, the other part of the Earth receives sunlight for .... a day.

   a. 14 hours b. 12 hours c. 10 hours d. 24 hours

4. At the noon, the Sun appears in the .... in the sky. (Cairo 2023)

   a. east b. west c. center d. left

5. The Sun appears as it moves from .... to .... (Luxor 2023)

   a. south – north b. west – east
   c. east – west d. north – south

6. You can see the Sun in the east at ....

   a. 7 p.m. b. 8 a.m. c. 5 p.m. d. 12 a.m.

7. If you travel from your country to another, the Sun will .... (Sharkia 2023)

   a. rise in the west and set in the east
   b. rise in the south and set in the north
   c. rise in the north and set in the south
   d. rise in the east and set in the west

8. In the following figure, which statement is true?

   a. The Sun will reach the east in less than 6 hours.
   b. The Sun will set in less than 6 hours.
   c. The figure shows the early morning.
   d. The figure shows the location of the Sun at noon.



9. The Earth's axis is an imaginary line that passes through the .... (Alex. 2023)
   a. center of the solar system.
   b. center of the moon.
   c. two poles of Earth.
   d. center of the Sun.

10. .... is the orbiting of an object around another object. (Alex. 2023)
    a. Rotation
    b. Spinning
    c. Revolution
    d. Gravity

11. The sequence of day and night results from the ....
    a. revolution of the Earth around the Sun
    b. rotation of the Earth on its axis
    c. revolution of the Sun around the Earth
    d. rotation of the Sun on its axis

12. If the Earth completed its spinning on its axis in 12 hours, the pattern of day and night ....
    a. would never occur
    b. would occur every 24 hours
    c. would take shorter time to occur
    d. would take longer time to occur

Q2. Put (✓) or (X):

1. The Sun, stars, and moon appear to move across the night sky due to the Earth's rotation. ( )
2. The movement of a tree's shadow throughout the day results from the spinning of Earth around its axis. ( )
3. At midday, the Sun is perpendicular to you above your head. ( )
4. All the parts of Earth receive sunlight at the same time. (Port Said 2024) ( )
5. Half of Earth appears dark at night as it receives a lot of light.
6. The Sun rises in the east and sets in the west. (Dakahlia 2024) ( )
7. The Sun appears in the same place in the sky throughout the day. ( )
8. If you traveled to another country, the Sun would be moving from the east to the west. ( )
9. The orbiting of Earth around the Sun is called rotation. ( )

10 The sequence of day and night is due to the rotation of the Earth on its axis. (Dakahlia 2024) (   )

11 Earth's revolution around the Sun causes day and night. (Alex. 2024) (   )

12 The Earth takes (12) hours to make a complete cycle on its axis. (Qalyoubia 2024) (   )

Q3. Correct the underlined word:

1 The Sun rises in the <u>west</u>. (Cairo 2024) (..............................)

2 In the <u>early morning</u> the sun would be in the west direction in the sky. (Alex. 2024) (..............................)

3 Earth takes <u>24 hours</u> to make two successive complete cycles on its axis. (..............................)

4 Earth takes 24 hours to make one complete rotation around <u>the Sun</u> . (..............................)

Q4. Write the scientific term:

1 It is a phenomenon that occurs when the Earth rotates on its axis. (Alex. 2024) (..............................)

2 It is a phenomenon that occurs when half of the Earth faces the Sun. (..............................)

3 It is a phenomenon that occurs when half of the Earth doesn't receive any sunlight. (..............................)

4 The spinning of Earth on its axis. (Cairo 2023) (..............................)

5 It is an imaginary line passing through the two poles of Earth. (Aswan/Damietta 2024) (..............................)

6 It is the time taken by the Earth to complete one rotation on its axis. (..............................)

Q5. Complete the following sentences:

1. When half of the Earth faces the Sun, it has .... and the other half has ....
2. The Sun appears as it moves from .... to .... due to the Earth's .... on its ....
3. Earth rotates its axis once every .... hours. (Beheira 2024)
4. In early morning, the Sun appears in the .... while at noon it appears in the .... of the sky. (Cairo 2023)
5. The orbiting of the Earth around the Sun is called ....
6. The imaginary line that passes through the Earth's center is called .... (Giza 2023)

Q6. Classify the following to revolution or rotation: (Qalyobia 2024)

1. It is the spinning of an object around an axis. (....................)
2. It is the spinning of an object around another object. (....................)

Q7. Give reasons for:

1. The occurrence of day and night. (Damietta/Giza 2024)

....

2. The Sun appears to move across the sky from the east to the west.

....

Q8. What happens if:

1. Half of the Earth faces the Sun? (Giza/ Sharkia 2024)

....

....

2. The Earth rotates on its axis? (Giza/ Gharbia 2024)

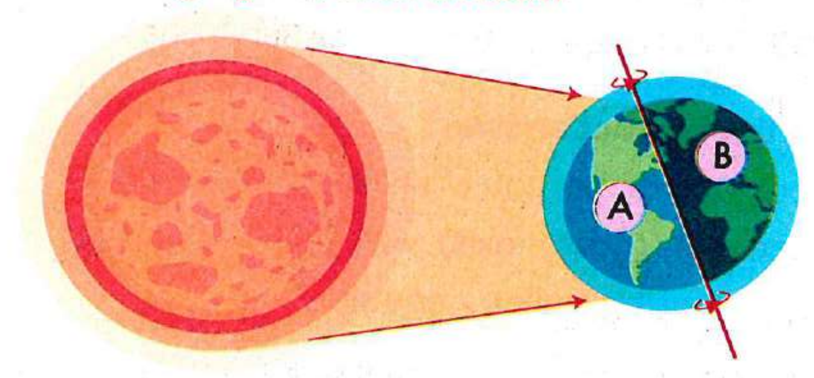
....

....

3. The Earth doesn't rotate on its axis? (Port Said 2024)

....

Q9. Study the following figure, then choose:



1. Which location is experiencing daytime?
   a. Location (A) because it is facing the Sun.
   b. Location (B) because it is facing the Sun.
2. Which location on Earth doesn't receive sunlight?
   a. Location (A)
   b. Location (B)

Q10. Study the following figures, then put (✓) or (✗):

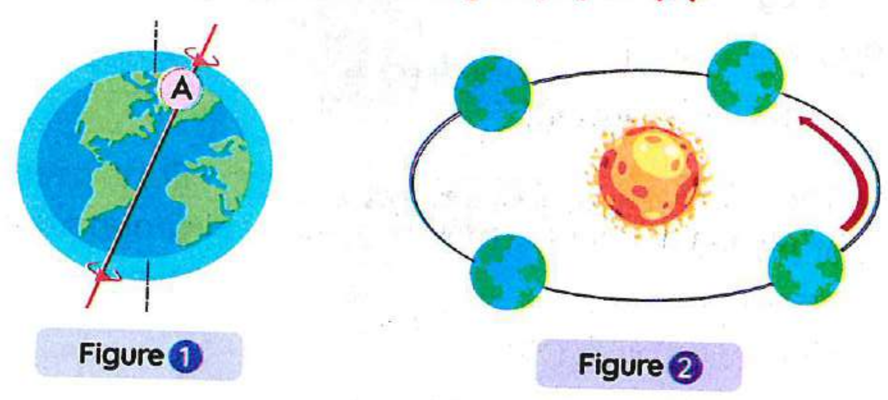


Figure 1 Figure 2

1. Figure 1 shows the Earth's rotation on its axis. ( )
2. Figure 2 represents the revolution of the Sun around the Earth. ( )
3. The cycle of day and night occurs due to the movement of the Earth in figure 1. ( )
4. The line (A) in figure 1 is a real line that passes through the Earth's two poles. ( )

Lesson 2

Activity 4 Rotation



Choose the correct answer:

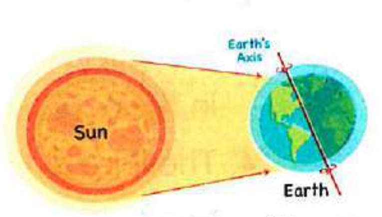
If you look at a globe, you will notice that the Earth spins around its (orbit - axis), which runs vertically through the Earth's (poles - equator).

Cycle It is a series of events that are repeated in the same order.
هي سلسلة من الأحداث تتكرّر بنفس الترتيب.

Examples of Cycles

Cycle	is a result of	Reason
The cycle of day and night	is a result of	• Earth's rotation around its axis every 24 hours (one day).
The cycle of the four seasons	is a result of	• Earth's revolution around the Sun every year.

Cycle of day and night:



- Earth rotates counterclockwise (from the west to the east) on its vertical axis, which passes through the two poles of Earth, causing the cycle of day and night.

• تدور الأرض عكس عقارب الساعة من الغرب إلى الشرق حول محورها الذي يمر بمركزَي الأرض؛ مما يؤدي لتعاقب النهار والليل.

What happens if:

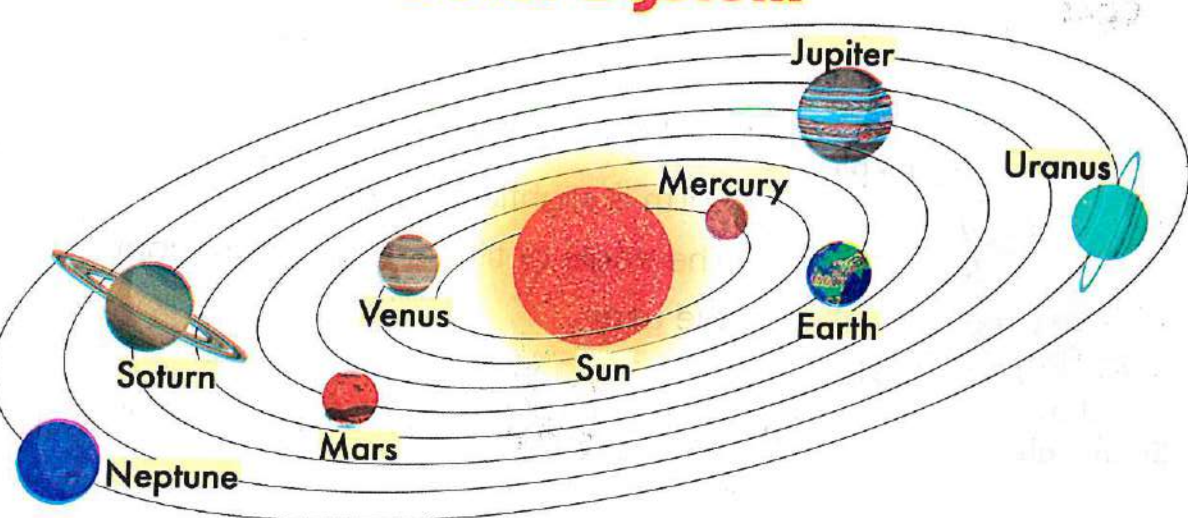
1 The Earth stops spinning on its axis?

- The cycle of day and night will not occur.

2 The Earth takes 12 hours only to spin on its axis?

- The cycle of day and night will be repeated every 12 hours.

Solar System



- The solar system includes one star, which is the Sun, and eight planets that revolve around the Sun in fixed orbits.
- Planets rotate on their axes at different speeds.
- Jupiter is the fastest-rotating planet on its axis in the solar system.

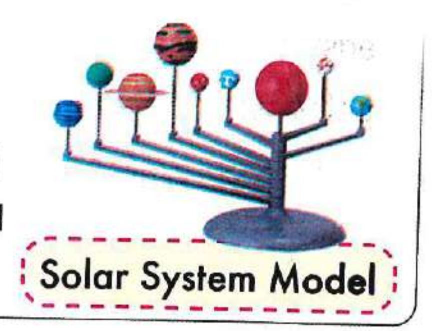
• تتكوَّن المجموعة الشمسية من الشمس وثمانية كواكب تدور حول الشمس في مدارات محددة.
• تدور الكواكب حول محاورها بسرعات مختلفة.
• يُعد كوكب المشتري أسرع كوكب يدور حول محوره في المجموعة الشمسية.



Evaluate Your Learning!

Choose the correct answer:

If you look at a solar system model, you will notice that planets (rotate – revolve) around the Sun in fixed (axes – orbits).

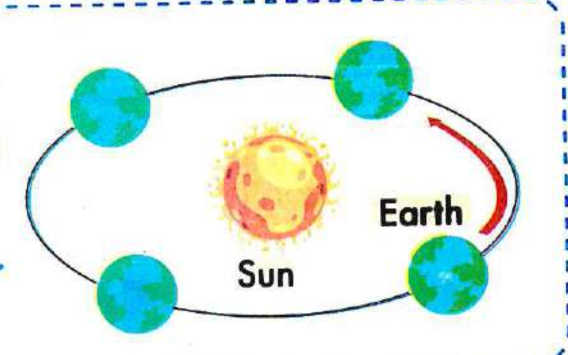


Solar System Model

Activity 5 Sunrise

- The Earth's path around the Sun is not perfectly circular; it is an **elliptical orbit (oval path)** like an elongated circle.

• مسار الأرض حول الشمس ليس دائريًّا تمامًا، ولكنه بيضاوي الشكل مثل دائرة ممدودة.



North Pole
23.5°
Axis
South Pole

- Earth is slightly **tilted** on its axis.
- The angle of tilt **changes** throughout the year.

• دوران الأرض حول محورها يكون بشكل مائل قليلًا.
• تتغيَّر زاوية الميل على مدار العام.

Both:
1. The elliptical orbit of the Earth
2. The tilt of the Earth on its axis

cause

- The Sun to appear to travel across the sky at slightly different speeds each day.
- The difference in the time of sunrise and sunset each day.

• يؤدي الجمع بين مدار الأرض البيضاوي وميل الأرض حول محورها إلى:
1. ظهور حركة الشمس في مسارات مختلفة عبر السماء بسرعات مختلفة على مدار اليوم.
2. اختلاف أوقات شروق الشمس وغروبها كل يوم على الأرض.

Now, let's study the sunrise and sunset in some cities in Egypt.

- The Sun rises in the east and sets in the west.
- The cities in the **east** see the sunrise **before** the cities in the **west**.

• تشرق الشمس من الشرق، وتغرب من الغرب. • المدن التي تقع في الشرق، تشرق الشمس فيها قبل المدن التي تقع في الغرب.

Concept 2

For example:

- The following two tables show the sunrise, sunset, and the length of day from Dec. 1 to Dec. 3 in two different cities in Egypt, which are:

In Marsa Alam
A city in the far east of Egypt

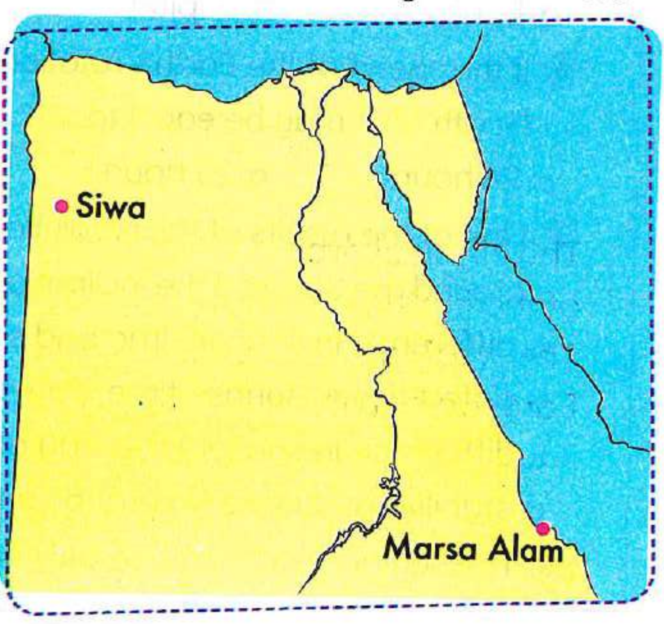
Day	Sunrise	Sunset	Length of Day
Dec. 1	6:08 a.m.	4:50 p.m.	10:41:44
Dec. 2	6:09 a.m.	4:50 p.m.	10:41:05
Dec. 3	6:09 a.m.	4:50 p.m.	10:40:28

In Siwa
A city in the far west of Egypt

Day	Sunrise	Sunset	Length of Day
Dec. 1	6:54 a.m.	5:19 p.m.	10:24:55
Dec. 2	6:55 a.m.	5:19 p.m.	10:24:08
Dec. 3	6:55 a.m.	5:19 p.m.	10:23:23

From the previous tables, we can conclude the following information:

- Marsa Alam sees the sunrise **46 minutes** before Siwa.
- The length of day **decreases** in Marsa Alam and Siwa from Dec.1 to Dec 3.
- The **length of day** in Marsa Alam is always **longer** than it is in Siwa.



• الشمس تشرق في مدينة مرسى علم قبل واحة سيوة بحوالي 46 دقيقة.

• يقصر طول النهار في مدينتي مرسى علم وسيوة خلال الفترة من 1 ديسمبر إلى 3 ديسمبر.

• طول النهار في مدينة مرسى علم دائمًا أطول من طول النهار في مدينة سيوة.

Exercises on Lesson 2

Q1. Choose the correct answer:

1. The number of stars in the solar system is .... (Giza 2023)
   a. eight b. nine c. one d. two
2. The solar system consists of some .... revolve around .... (Cairo2023)
   a. Sun — planets
   b. satellites — the moon
   c. planets — the moon
   d. planets — the Sun
3. The Earth orbits around the .... in .... path.
   a. Sun - a rectangular
   b. moon - an oval
   c. Sun - an elliptical
   d. moon - a circular
4. The Earth's axis is ....
   a. oval b. horizontal c. circular d. vertical
5. The fastest planet that rotates on its axis in the solar system is .... (Alex. 2023/ Damietta 2024)
   a. Earth b. Jupiter c. the moon d. Mars
6. If the speed of the Earth's rotation on its axis increases, the day length on it may be equal to ....
   a. 24 hours b. 25 hours c. 28 hours d. 22 hours
7. One of the results of the revolution of Earth in an elliptical orbit around the Sun and the inclination of its axis is the ....
   a. difference in sunrise time and sunset time, day after day
   b. difference in sunrise time, day after day
   c. difference in sunset time, day after day
   d. stability of sunrise time and sunset time, throughout the year
8. The Sun appears to move with slightly different speeds each day due to ....
   a. the elliptical orbit of Earth
   b. the tilt of Earth on its axis
   c. the circular orbit of Earth
   d. both a and b

9 If the Earth rotates clockwise on its axis, the Sun would appear to move from the .... to the ....

a. east – west b. west – north c. east – south d. west – east

10 A city in the west of Egypt sees the sunrise at 6: 31 a.m., so a city in the east may see the sunrise at .... at the same day.

a. 6 : 42 a.m. b. 6 : 28 a.m. c. 6 : 31 a.m. d. 6 : 55 a.m.

Q2. Put (✓) or (✗):

1 Earth revolves around the Sun once every one day. (Gharbia 2023) ( )

2 The Sun is a planet that lies at the center of the solar system. ( )

3 Earth rotates on its axis in a clockwise direction. (Alex. 2024) ( )

4 Planets rotate on their axes at the same speed. ( )

5 The Sun doesn't revolve around Earth. (Dakahlia 2023) ( )

6 The rotation of Earth around the Sun causes day and night phenomena. (Cairo 2023) ( )

7 Earth rotates on its axis slower than Jupiter. (Kafr El-Sheikh 2024) ( )

8 Jupiter is the fastest planet that rotates on its axis. (Giza/ Gharbia 2024) ( )

9 The day on Jupiter is shorter than the day on Earth. ( )

10 Earth rotates counterclockwise on its axis from the east to the west. ( )

11 The lengths of day and night are always equal during the whole year. (Menoufia 2023) ( )

12 The sunrise and the sunset occur at the same time every day. (Cairo 2024) ( )

Q3. Correct the underlined word:

1 The Earth revolves around the Sun in a rectangular shaped orbit. (Dameitta 2024) (..................)

2 The cycle of day and night results from the revolution of the Earth around the Sun. (..................)

3 Earth revolves around the Sun once every one day. (..................)

4 The Earth rotates around its axis once every 30 hours. (..................)

Q4. Write the scientific term:

1. A series of events repeated in the same order. (....................)
2. A cycle resulted from the revolution of the Earth around the Sun. (....................)
3. The fastest planet during its rotation on its axis. (Giza. 2024) (....................)
4. A system that is formed of the Sun and eight planets revolving around it. (Alex. 2024) (....................)
5. It is located in the center of the solar system. (....................)

Q5. Complete the following sentences:

1. .... contains the sun and eight planets revolving around it. (Giza/ Qalyobia 2024)
2. Seasons phenomenon occurs due to the revolution of Earth around the .... (Dakahlia 2024)
3. The cycle of .... happens due to Earth's revolution around the Sun. (Qalyobia 2024)
4. The Sun appears to move with slightly different speeds each day due to the .... orbit of Earth and the tilt of Earth on its ....
5. The solar system contains one .... and eight ....
6. Earth rotates on its axis in .... direction from .... to ....

Q6. Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Earth's axis	a. is the center of the solar system.
2 The Sun	b. is the fastest planet rotating around its axis.
3 Jupiter	c. results from the Earth's revolution around the Sun.
4 The seasons cycle	d. is vertical and passes through the two poles of Earth.

1 .... 2 .... 3 .... 4 ....

Q7. Give reasons for:

1. The occurrence of four seasons. (Kafr El-Sheikh 2024)

....

....

2. The day length is different from a city to another.

....

....

3. The day on Earth is longer than the day on Jupiter.

....

....

Q8. What happens if:

1. The Earth stops rotating around its axis?

....

....

2. The Earth's axis isn't tilt?

....

....

3. The Earth rotates in clockwise direction on its axis?

....

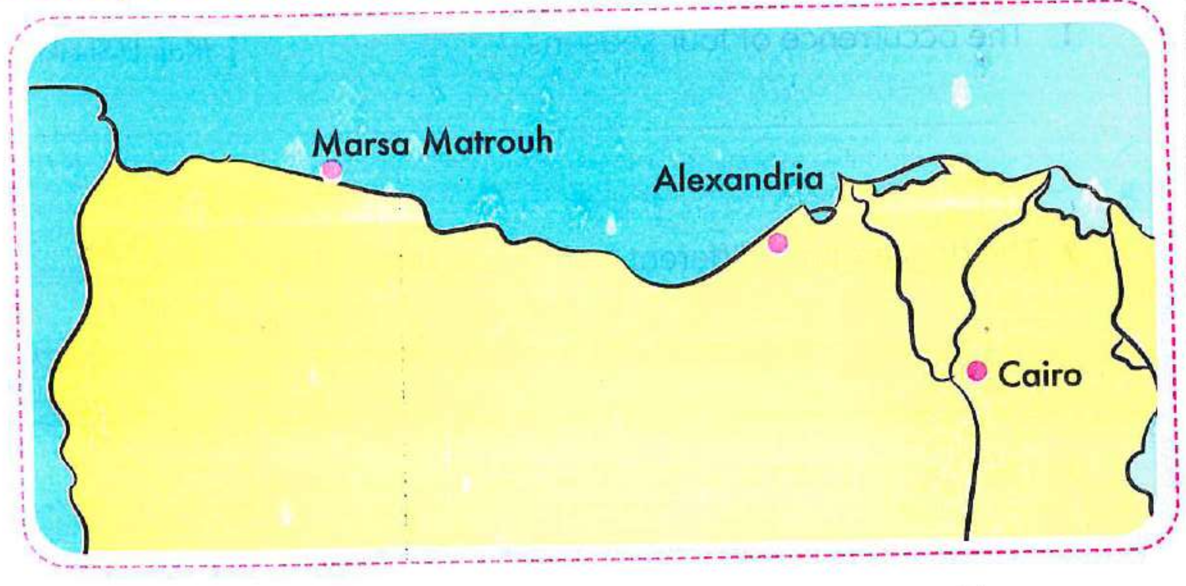
....

4. Both Earth and Jupiter spin on their axes at the same speed?

....

....

Q9. Study the following figure, then choose the correct answer:



1. If the sunrise in Alexandria is at 6:32 a.m., the sunrise in Marsa Matrouh will be at .... a.m.

   a. 6 : 32 b. 6 : 35 c. 6 : 27

2. The sunset time in Alexandria and Marsa Matrouh is different due to ....

   a. the tilt of Earth on its axis
   b. the elliptical orbit of Earth
   c. both a and b

3. If you are going on a trip from Alexandria eastward to Cairo, you will see the sunrise .... the sunrise in Alexandria.

   a. after b. before c. at the same time of



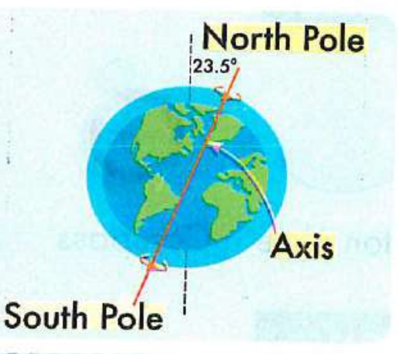
Activity 6 Effects of Earth's Rotation

- Earth rotates on its axis from the west to the east (counterclockwise) at a very high speed of more than 1,600 kilometers per hour.

• يدور كوكب الأرض حول محوره من الغرب للشرق (عكس عقارب الساعة) بسرعة كبيرة جدًّا تزيد عن 1600 كيلومتر في الساعة.



We don't feel Earth's rotation on its axis.
Because we are moving with the same speed of the Earth's rotation on its axis.



Movement of Objects in the Sky

- Earth's rotation on its axis causes the apparent movement of some celestial bodies, such as:

1. The Sun appears to rise in the east and set in the west.
2. Stars seem to move in the night sky, where some stars seem to rise and set, like the Sun.

• يؤدي دوران الأرض حول محورها إلى حدوث الحركة الظاهرية لبعض الأجرام السماوية مثل:

1. تظهر الشمس أنها تشرق من الشرق وتغرب من الغرب.
2. تظهر النجوم كأنها تتحرك في السماء ليلًا، كما تظهر بعض النجوم كأنها تشرق من الشرق وتغرب من الغرب كالشمس.

Movement of shadow during the daytime

Earth's rotation on its axis —Causes→ **Sun appears to move in the sky** —Causes→ **The movement of the object's shadow.**

- The movement of the object's shadow proves that Earth rotates on its axis.

Activity 7 What Can Shadows Tell Us?

» The ancient Egyptians invented the first time piece that is used to know time called a **sundial** (shadow clock).

Experiment

» In this activity, we will make a model of sundial (shadow clock)

Tools:



Carton plate



Compass



Clay



Ruler



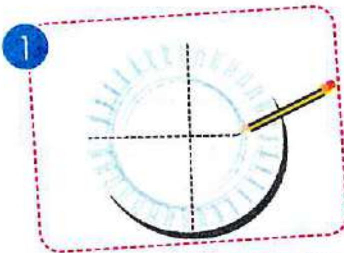
Protractor



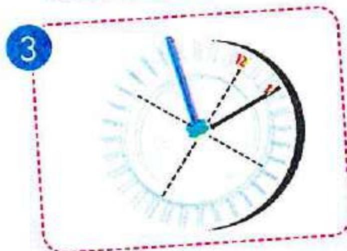
Plastic straw

Steps:

1. Draw reference lines that split the **cardstock** vertically and horizontally. The intersection of these two lines is the center of the cardstock.
2. Use **clay** to fix the straw in the center of the **cardstock**.
3. Put a sundial in an open area facing the north direction.
4. Measure the length of the shadow every two hours using the **ruler**.
5. Measure the angle of the shadow with the horizontal line using the **protractor**.
6. Record the lengths and angles in the data table.







Time	10:00 a.m.	12:00 p.m.	2:00 p.m.
Shadow Length (cm)	18	10	17
Shadow Angle	50°	90°	140°

Observation:

- The lengths and angles of the shadows change throughout the day.

• يتغيَّر طول الظل وزاوية الظل لنفس الجسم على مدار اليوم.

Conclusions:

- Earth's rotation around its axis affects the position of the Sun in the sky. So, the length and angle of the shadow change throughout the day.

• يُؤثِّر دوران الأرض حول محورها على موقع الشمس في السماء؛ وبالتالي يتغير طول الظل وزاوية الظل للجسم على مدار اليوم.

The factors that affect the length and angle of a shadow

① The amount of sunlight that reaches the Earth during different seasons.

② The position of the Sun throughout the day.

In the early morning



The sun is low in the sky (in the east)

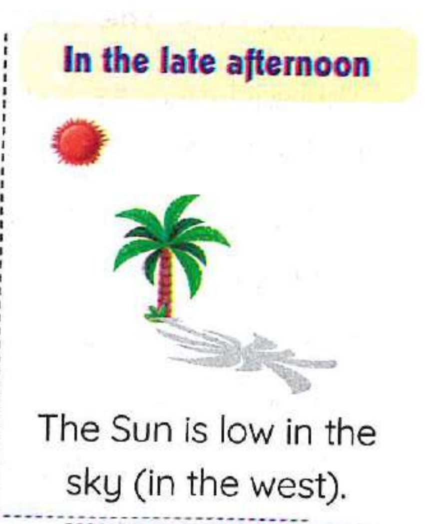
At noon



The Sun is high in the sky.

An object has the shortest shadow.

In the late afternoon



The Sun is low in the sky (in the west).

An object has the longest shadow.

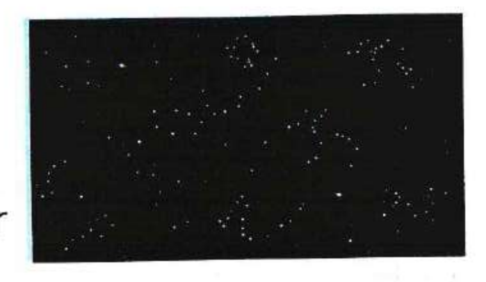
Unit 4



Activity 8 Constellations Visible During Different Seasons

In the following image:

Stars in a night sky are not connected to each other, in real, but if we draw imaginary lines between them, they may form a certain shape, such as an animal or a person; this is called a constellation.



• رغم أن النجوم ليست متصلة ببعضها البعض، إلا أننا إذا رسمنا خطوطًا في السماء بينها، فقد تشكل شكلًا معينًا مثل حيوان أو شخص، وهذا ما يُسمى بالتجمعات النجمية.

Constellation



- It is a group of stars that looks like it forms a pattern of a certain shape in the sky..

• التجمع النجمي: مجموعة من النجوم تُكوِّن معًا شكلًا معينًا في السماء.

Example: The Constellation Orion

- The ancient Greeks gave it this name relative to a mythical hunter.



• يُعتبر أوريون (الصياد) من أمثلة التجمعات النجمية،
وأطلق عليه اليونانيون القدماء هذا الاسم نسبة إلى صياد أسطوري.

Importance of Constellations

- Locations of constellations during the year help us determine the main four directions (north, south, east, and west).

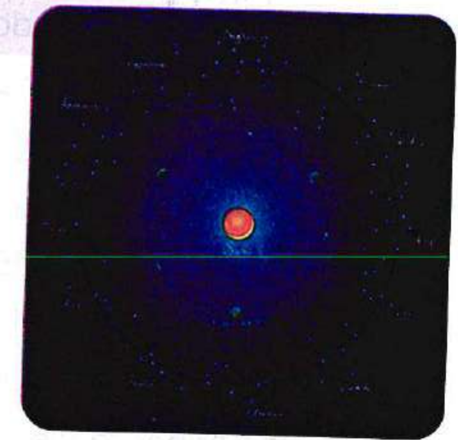
• قد تساعدنا معرفة أماكن بعض التجمعات النجمية على تحديد الاتجاهات المختلفة، مثل: الشمال أو الجنوب أو الشرق أو الغرب.

Motion of Constellations

1 Earth's rotation on its axis causes:

- Stars seem to move across the night sky, but in fact, their positions don't change.

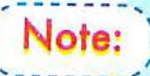
2 Earth's revolution around sun causes:



- Constellations appear at different locations in the sky during different times of the year.
- We can see different constellations in winter than in summer.



1. Every night, new stars appear from the east in the sky.
   Because the part of the night sky we see from a certain place on Earth changes a little bit every night.
   • تظهر نجوم جديدة كل ليلة من جهة الشرق؛ لأن اتجاه الأرض الذى يواجه السماء ليلًا يتغير قليلًا.
2. Some constellations still exist even though we cannot see them in the sky.
   Because they are not visible from where we are located on Earth.
   • توجد بعض التجمعات النجمية، ولكننا لا نستطيع رؤيتها من الأرض؛ لأنها غير مرئية من مكاننا على الأرض.



Note: After one Earth's revolution around the Sun, you can see the same constellations in the night sky again.

Evaluate Your Learning!

Put (✓) or (✗):

1. Stars of the Orion constellation are very far from us. ( )
2. We can see different constellations in winter than in summer. ( )

Unit 4

Exercises on Lesson 3

Q1. Choose the correct answer:

1 Earth's rotation on its axis causes all the following, except ....

a. the sunrise and sunset of the Sun

b. the sequence of day and night

c. the movement of shadows

d. the sequence of seasons

2 Formation of shadows of objects happens due to .... (Assiut 2023)

a. the revolution of Earth around the Sun.

b. the revolution of Earth around the moon.

c. the appearance of stars as they move in the sky.

d. the appearance of the Sun as it moves in the sky.

3 The idea of sundial depends on ....

a. the formation of shadows

b. the rotation of object around its axis

c. the motion of the moon

d. falling of objects under the effect of gravity

4 Lengths and angles of shadows of objects are affected by ....

(Cairo2023)

a. the change in the position of the Sun in the sky

b. the distance between Earth and the Sun

c. the revolution of Earth around the Sun

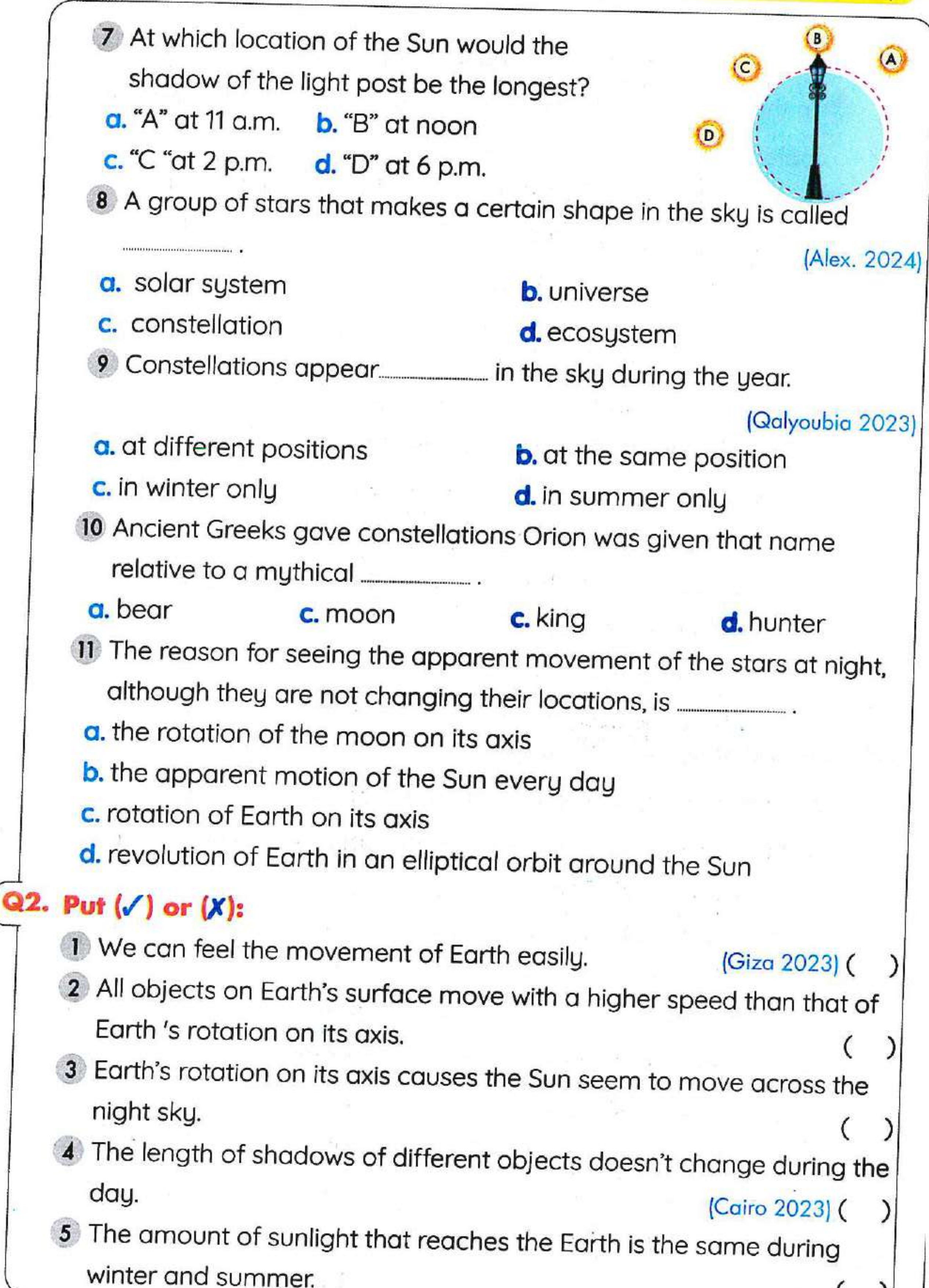
d. the revolution of the moon around Earth

5 The shortest shadow of an object happens .... (Cairo 2023)

a. at night b. in afternoon c. at noon d. in morning

6 If the Sun is setting in the western part of the sky, in which direction will we find the shadow of an object?

a. South b. North c. East d. West



7. At which location of the Sun would the shadow of the light post be the longest?
   - **a.** "A" at 11 a.m.
   - **b.** "B" at noon
   - **c.** "C "at 2 p.m.
   - **d.** "D" at 6 p.m.

8. A group of stars that makes a certain shape in the sky is called .... (Alex. 2024)
   - **a.** solar system
   - **b.** universe
   - **c.** constellation
   - **d.** ecosystem

9. Constellations appear.................. in the sky during the year. (Qalyoubia 2023)
   - **a.** at different positions
   - **b.** at the same position
   - **c.** in winter only
   - **d.** in summer only

10. Ancient Greeks gave constellations Orion was given that name relative to a mythical ....
    - **a.** bear
    - **c.** moon
    - **c.** king
    - **d.** hunter

11. The reason for seeing the apparent movement of the stars at night, although they are not changing their locations, is ....
    - **a.** the rotation of the moon on its axis
    - **b.** the apparent motion of the Sun every day
    - **c.** rotation of Earth on its axis
    - **d.** revolution of Earth in an elliptical orbit around the Sun

Q2. Put (✓) or (✗):

1. We can feel the movement of Earth easily. (Giza 2023) (   )
2. All objects on Earth's surface move with a higher speed than that of Earth 's rotation on its axis. (   )
3. Earth's rotation on its axis causes the Sun seem to move across the night sky. (   )
4. The length of shadows of different objects doesn't change during the day. (Cairo 2023) (   )
5. The amount of sunlight that reaches the Earth is the same during winter and summer. (   )

6. When the Sun is low in the sky, it forms a long shadow of an object. ( )
7. In the afternoon and morning, the Sun forms a longer shadow of an object. ( )
8. The Sun appears in the same place in the sky all the day. (Menoufia 2024) ( )
9. Constellations have similar shapes in the sky. (Luxor 2023/ Alex. 2024) ( )
10. The constellations help us to determine the main directions. (Cairo 2023) ( )
11. Constellations that appear in the sky are different in winter than in summer. (Menofia 2023) ( )
12. Constellations seem to move across the night sky. ( )
13. We can see Constellation Orion in the sky every day throughout the year. ( )
14. Constellations change their positions throughout the year. ( )

Q3. Correct the underlined word:

1. Earth rotates on its axis at low speed. (..................)
2. At noon the Sun forms the longest shadow of objects. (Alex. 2023) (..................)
3. Formation of a shadow of an object is due to the movement of the moon across the sky. (..................)
4. Every night, we can see new stars appear from the west direction. (..................)
5. Constellation is a group of planets that forms a pattern in the sky. (..................)
6. The stars we see in Constellation Orion are very near to us. (..................)

Concept 2

Q4. Write the scientific term:

1. It is the first timepiece that is used by ancient Egyptians to know the time. (..................)
2. It is a group of stars that forms a pattern in the sky. (Luxor 2023/ Damietta 2024) (..................)

Q5. Complete the following sentences:

1. All objects that are attached to the surface of Earth are moving with the .... speed of Earth's rotation on its axis.
2. The amount of sunlight that reaches the Earth's surface during the day changes during different ....
3. The position of the .... in the sky affects the angles and .... of the shadow of objects.
4. The first time piece that is used to know the time is called .... and it depends on the formation of .... (Damietta 2024)
5. If the Sun locates at .... or west in the sky, it forms the .... of objects.
6. At noon, the Sun is high and most directly above us in the sky, so it forms the .... shadow. (Kafr El-Sheikh 2024)
7. Constellation .... is called by this name by ancient Greeks relative to a mythical hunter.
8. Rotation of .... on its .... causes the stars to appear to move across the night sky.
9. Knowing the position of .... in the sky, helps us to know the main directions.
10. After one Earth's revolution around the ...., you can see the same .... in the night sky again.

Q6. Give reasons for:

1. Although Earth rotates on its axis, we don't feel its movement. (Luxor 2023)

....

2. The length of the shadow of an object changes throughout the day.

.... (Cairo 2023)

3 Stars seem to move across the night sky.

....

4 Every night, new stars appear from the east in the sky.

....

5 We can see different constellations in winter than in summer.

....

Q7. What happens to:

1 A tree's shadow in the morning and at noon? (Dakahlia 2024)

....

2 The position of constellations in the night sky throughout the year?

....

Q8. Study the following figure, then choose:

1 When the Sun locates at .... , it forms the longest shadow of the rock.

a. position " A"
b. position "B"
c. position "C"
d. positions "A" and "B"



2 When the Sun locates at .... , it forms the shortest shadow of the rock at ....

a. position " A" - 8 a.m.
b. position " A" - 12 p.m.
c. position "C" – 4 p.m.
d. position "C" – 10 p.m.

Q9. From the opposite figure: (Sharkia 2024)

1 This figure represents constellation ....

2 This constellation consists of a group of ....

Lesson 4



Activity 9 Constellations



Stars



- Stars make their own light.
- Stars are made of hot gases, which make them bright.



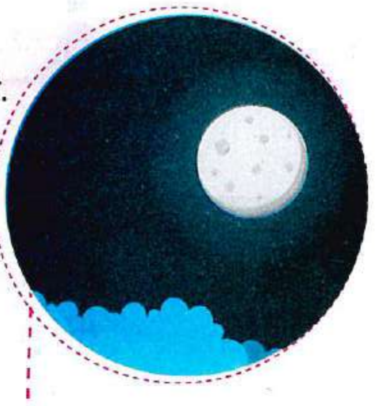
Stars appear bright in the sky.

Stars are made of hot gases, which make them bright.

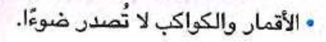
- تبدو النجوم مضيئة؛ حيث تتكوَّن النجوم من غازات ساخنة تتسبَّب في توهجها.



Planets and Moons



- Planets and moons do not make their own light.



- الأقمار والكواكب لا تُصدر ضوءًا.



Although the moon is a dark body, but seems bright in the night sky?

Because the moon reflects the light of the Sun.

- القمر يبدو مضيئًا على الرغم من أنه لا يُصدر ضوءًا؛ لأنه يعكس ضوء الشمس.

Constellations

- Some constellations are always visible, and others can only be seen during specific seasons.
- بعض التجمعات النجمية تكون ظاهرة، وبعضها الآخر يرتبط ظهوره بفصول سنة محددة.



The location of constellations near the North and South Poles changes a little bit during the year.

Because stars close to the North and South Poles move slightly in the sky.

- يتغيَّر مكان النجوم في التجمع النجمي بشكل بسيط على مدار العام؛

لأن النجوم القريبة من الأقطاب السماوية تتميَّز بحركة دورانها البسيطة.

Activity 10 Phases of the Moon

» The moon passes through **different phases** through its **revolution around the Earth.**

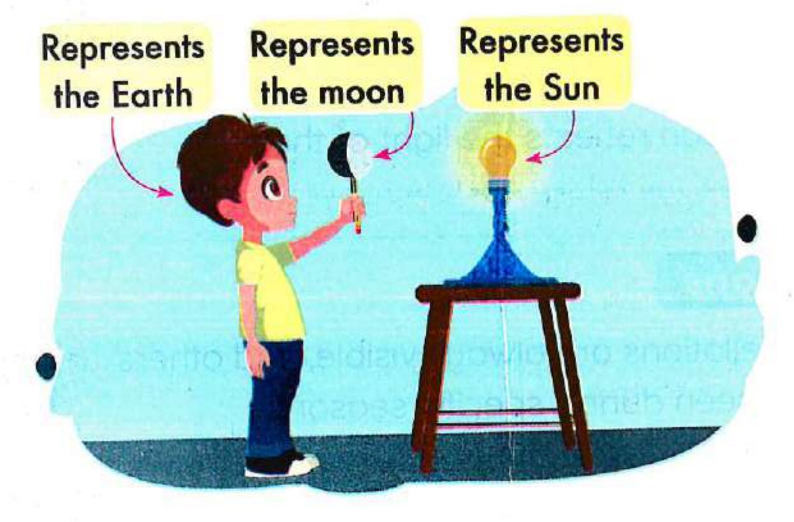
Experiment: Making the Earth-Moon-Sun Model

» In this activity, we will identify some phases of the moon by making **an** Earth-Moon-Sun model.

Tools:



Steps:



1. Turn on the lamp and darken the room.
2. Push the sharpened pencil into the foam ball.
3. Hold the ball as shown in the figure.

Steps	Observations	Figures
④ Look at the foam ball.	The side of the ball that faces you appears completely dark; this phase is the "New Moon".	
⑤ Turn your hand slowly about 45 degrees to the left and observe the foam ball.	The right edge of the ball will be illuminated this phase is the "Crescent".	
Note: The Crescent should start very thin and then thicken up as the moon moves farther away from the Sun.		
⑥ Turn your hand to the left and keep your hand extended until your back faces the lamp.	The foam ball appears completely bright; this phase is called the "Full Moon".	
⑦ Turn your hand to the left and keep your hand extended until your back faces the lamp.	The left edge of the ball will be illuminated as a "Crescent".	

Conclusions:

- The moon doesn't create its own light, but it reflects the sunlight that falls on it.
- Moon phases change as the moon revolves around the Earth.

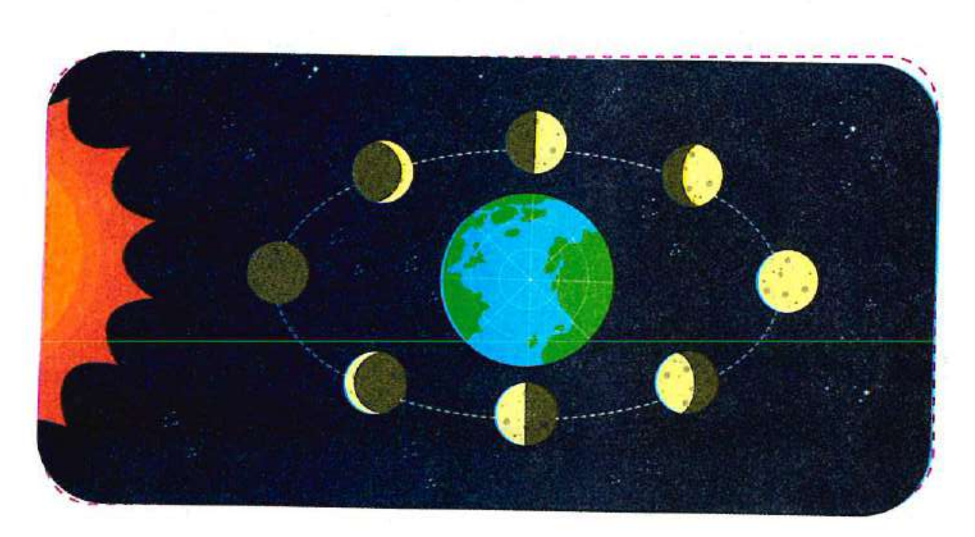
• القمر لا يُصدر ضوءًا، لكنه يعكس ضوء الشمس الساقط عليه. • تتغيَّر أوجه القمر أثناء دورانه حول الأرض.

The moon phases during the lunar month "Hijri month":

Moon Phase	Description
① First Crescent	• The edge of the moon's face appears as an illuminated crescent (small and shiny). • Its size increases gradually with time. • This phase is the first phase of the moon phases.
② First Quarter	• One half of the moon's face is illuminated. • The other half of the moon's face is darkened.
③ First Gibbous	• The bright illuminated end part of the moon's face increases gradually. • The line separating the illuminated part and the darkened part appears curved.
④ Full Moon	• The apparent face of the moon that faces the Earth is fully illuminated. • This phase appears in the middle of the lunar month.
⑤ Second Gibbous	• The illuminated part of the moon's face decreases gradually. • The line separating the darkened part and the illuminated part appears curved.
⑥ Second Quarter	• One half of the moon's face is darkened. • The other half of the moon's face is illuminated.
⑦ Second Crescent	• The edge of the moon's face is an illuminated crescent.
⑧ New Moon	• The apparent face of the moon that faces the Earth is fully darkened. • This phase appears on the last day of the lunar month.

- The moon phases are changed during the lunar month, "Hijri month".
- The cycle of the lunar phases is repeated at the beginning of each lunar month.

• تتغيَّر أطوار القمر خلال الشهر القمري (الهجري). • تبدأ دورة القمر مع بداية كل شهر هجري (قمري).



Guidelines

Key Points	The moon's phase will be:
The moon appears fully illuminated. (It appears as a completely bright circle.) We can't see the moon in the sky.	Full Moon
The moon appears fully darkened.	New Moon
One half is illuminated + the other half is darkened.	Quarter
The edge of the moon's face appears illuminated. (The bright part is less than the dark one.)	Crescent
The bright part is greater than the dark one.	Gibbous

Give reasons for:

1. The moon has different phases in the night sky.

Due to:

- The moon's revolution around the Earth.
- Both Earth and the moon revolution together around the Sun.

2. The moon is a dark body, but we see it shiny in the sky.

Because the moon reflects the sunlight falling on it.

What happens if:

1. Half of the moon faces the Sun?

Half of the moon face is illuminated and appears in the quarter phase.

2. The moon lies between the Earth and the Sun?

The moon appears fully darkened (new moon phase).

3. The Earth lies between the Sun and the moon?

The moon appears fully illuminated (full moon phase).

Evaluate Your Learning!

Put (✓) or (✗):

1. The moon is located in the center of the solar system. ( )
2. New moon is a moon phase that appears at the end of the Hijri month. ( )
3. The moon seems illuminated to us because it reflects the sunlight. ( )
4. Moon phases change as the moon revolves around the Earth. ( )

Exercises on Lesson 4

Q1. Choose the correct answer:

1 The .... and .... don't make their own light. (Gharbia 2023)
a. moons – stars
b. Sun – planets
c. stars – Sun
d. moons – planets

2 The Sun and other stars are made up of .... (Cairo 2023)
a. hot solids
b. hot gases
c. cold solids
d. cold liquids

3 .... are celestial bodies that make their own light. (Sharkia 2023)
a. Moons and planets
b. The Sun and stars
c. The Sun and planets
d. Earth and the Sun

4 The Sun is a star because it .... (Cairo 2023)
a. gives off light
b. reflects light
c. absorbs light
d. allows light to pass through

5 We see the moon shining in the sky because it .... (Giza 2023)
a. absorbs sunlight
b. produces light
c. lets light pass through
d. reflects sunlight

6 The revolution of the moon around the Earth causes .... (Cairo 2023)
a. constellations
b. rotations
c. moon phases
d. planets gravity

7 The phase of the moon that appears on the last day of the lunar month is the .... phase. (Alex. 2024)
a. crescent
b. new Moon
c. full moon
d. gibbous

8 The moon appears as a completely bright circle in the .... phase.
a. new moon
b. full moon
c. second quarter
d. first quarter

9 After one ...., the cycle of moon phases will be repeated again.
a. revolution of the Earth around the moon
b. revolution of the moon around the Earth
c. revolution of the Earth around the Sun
d. revolution of the Earth around its axis

10 When half of the moon faces the Sun, we can see the moon in the .... phase.

a. crescent b. new moon c. full moon d. quarter

11 The appearance of the full moon in the sky shows that the face of the moon facing the Earth is ....

a. fully illuminated with sunlight

b. half illuminated with sunlight

c. three-quarters illuminated with sunlight

d. a quarter illuminated with sunlight

12 When the moon is in the new moon phase, this means that it is in the ....

a. start of the lunar month

b. first quarter

c. second quarter

d. end of its monthly cycle

13 A small part of the moon face seems illuminated in the .... phase.

a. new moon b. crescent c. gibbous d. full moon

14 The darkened part of the moon is greater than the illuminated part in the .... phase.

a. full moon b. gibbous c. new moon d. crescent

15 The moon appears completely dark in the .... phase, while it appears completely illuminated in the .... phase.

a. full moon – new moon

b. new moon – first quarter

c. new moon – full moon

d. full moon – second crescent

16 Half of the moon face can be seen illuminated in the .... phase.

a. new moon b. quarter c. gibbous d. full moon

Q2. Put (✓) or (✗):

1 Moons and planets can't make their own light. ( )

2 The moon reflects the sunlight that falls on it. (Menofia 2023) ( )

3 Stars are solid objects made up of rocks. ( )

4 Stars are made up of hot gases. (Menofia 2023) ( )

5 The moon seems shiny because it absorbs sunlight. (Qena 2023) ( )

6 Moons and stars make their own light. (Alex. 2023) ( )

7 The moon revolves around the Earth in an elliptical orbit. ( )

8 Both the Earth and the moon revolve around the Sun. ( )

9 The moon has different phases due to the movement of the Earth around the moon. ( )

10 Half of the moon face can be seen illuminated in the Crescent Phase. ( )

11 When the moon is between the Earth and the Sun, the moon can be seen as a completely bright circle. ( )

12 The new moon phase occurs when the moon is between the Earth and the Sun. ( )

13 The full moon phase appears in the middle of the lunar month. ( )

14 The moon appears in the new moon phase when the Earth is between the moon and the Sun. (Kafr El-Sheikh 2024) ( )

15 In the full moon phase, we can't see the moon in the sky. (Qalyobia 2024) ( )

16 The illuminated part of the moon in the gibbous phase is greater than that in the crescent phase. ( )

Q3. Correct the underlined words:

1 The Sun is a planet that can give out light. (Cairo 2024) (..................)

2 Stars are made up of hot liquids. (Giza 2024) (..................)

3 The moon seems bright as it absorbs sunlight. (Luxor 2023) (..................)

4 All celestial bodies make their own light. (..................)

5 The first moon phase is the quarter.. (Sharkia 2024) (..................)

6 The first gibbous phase follows the first crescent phase. (..................)

7 The moon phase at which the moon seems completely bright is the gibbous. (Damietta 2024) (..................)

8 In the second quarter phase, the left side of the moon is dark. (..................)

Concept 2

Unit 4

Q4. Write the scientific term:

1. They are huge celestial bodies that are made up of hot gases. (........................)
2. It is a dark celestial body that revolves around the Earth and reflects sunlight. (Alex. 2024) (........................)
3. It is the time taken by the moon to complete one cycle around the Earth. (........................)
4. It is the moon phase that appears in the middle of the lunar month. (........................)

Q5. Complete the following sentences:

1. Stars seem bright because they are made up of .... (Cairo 2023)
2. The moon can't make its own ...., but it .... the sunlight.
3. The moon has different phases due to the movement of both the .... and .... around the ....
4. The moon appears like a completely bright circle in the sky in the .... phase.
5. The edge of the moon is illuminated in the beginning of the lunar month at the .... phase.
6. The moon seems completely dark at the .... phase.
7. When the moon is in the new moon phase, this means that it is in the .... day of the lunar month.
8. .... are dark celestial bodies that rotate around the Sun in fixed orbits.
9. The moon appears in the .... phase when the .... lies between the moon and the Sun.
10. The moon completes one cycle around the Earth every lunar ....

Q6. Choose from column (A) what suits it in column (B):

(Dakahlia 2023 - Alex. 2024)

Column (A)	Column (B)
1 Crescent phase	a. is the moon phase in which more than half of the moon face is illuminated.
2 Gibbous phase	b. is the moon phase in which one edge of the moon face appears bright.
3 New Moon phase	c. is the moon phase in which half of the moon face is illuminated.
4 Quarter phase	d. is the moon phase in which the moon seems completely dark.

1 .... 2 .... 3 .... 4 ....

Q7. Cross out the odd word:

1. Crescent – Full Moon – Earth – Gibbous. (Giza 2024) (........................)
2. First Crescent – New Moon – Full Moon – Earth. (Cairo 2024) (........................)

Q8. Give reasons for:

1. The moon is a dark body, but we see it shiny at night. (Alex. - Giza 2024)

....

....

2. The moon has different phases during the lunar month. (Dakahlia 2024)

....

....

Q9. What happens if:

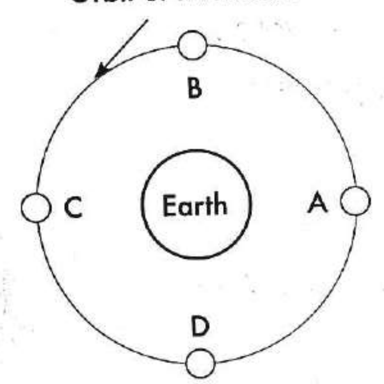
- Sunlight falls on the moon's surface? (Dakahlia 2024)

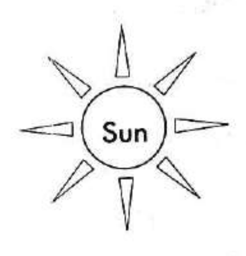
....

....

Q10. Study the following figure, then complete by using the words below:

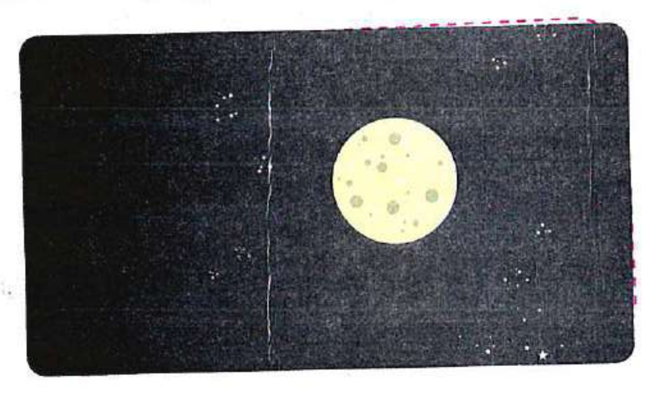
(full moon – crescent – quarter – new moon)





1. The moon appears in the .... phase when it is located at point (A).
2. The moon appears in the .... phase when it is located at point (B).
3. The moon appears in the .... phase when it is located at point (C).

Q11. Study the following figure, then put (✓) or (✗):



1. This represents the full moon phase. ( )
2. This phase occurs at the end of the lunar month. ( )
3. The first gibbous phase occurs before this moon phase. ( )

Lesson 5

Activity 11 What Are Stars?

Put (✓) or (✗):

1. The Sun is the biggest star in the universe. ( )
2. Our solar system contains eight planets only. ( )


Copernicus

- Copernicus proved that the Sun is the center of our solar system.

• أثبت العالِم كوبرنيكوس أن الشمس هي مركز مجموعتنا الشمسية.



The Sun

1. The Sun is a medium-sized star.
   الشمس نجم متوسط الحجم.
2. The Sun is the only star located in our solar system.
   الشمس هي النجم الوحيد الذي يقع داخل مجموعتنا الشمسية.
3. The Sun provides the Earth with heat and light, which are very important for life continuity.
   تمدنا الشمس بالضوء والحرارة اللازمة؛ لبقاء الحياة على سطح الأرض.
4. The Sun appears so bright in the sky because it is the largest object in the solar system and the closest star to Earth.
   تظهر الشمس بشكل لامع في السماء؛ لأنها أكبر جسم في المجموعة الشمسية، وهو النجم الأقرب للأرض.



» When you look up at the sky at night, you may be able to see thousands of stars.



Stars: They are giant spheres of superhot gases; most of them are hydrogen and helium.

النجوم: هي أجرام سماوية عملاقة تتكوَّن من غازات شديدة الانفجار كالهيدروجين والهيليوم.



» Stars appear bright in the sky.

Due to the burning hydrogen and helium found inside them.

• تظهر النجوم لامعة في السماء؛ بسبب التفاعلات التي تحدث بين الغازات المُكوِّنة لها.

How do stars, including the Sun, produce light and heat (thermal) energies?

» They use the energy produced from the reactions between gases (hydrogen and helium) to produce heat and light energies.

تحدث كثير من التفاعلات بين الغازات داخل النجوم؛ لتنتج طاقة حرارية وضوئية.

G.R

1. The Sun seems much larger for us than the other stars.

   Because the Sun is the nearest star to Earth, while other stars are farther away.

   • تبدو لنا الشمس بحجم أكبر من باقي النجوم في السماء؛ لأن الشمس أقرب نجم لكوكب الأرض، بينما باقي النجوم بعيدة جدًا عن كوكب الأرض.

2. There are 8 planets and more than 200 moons that revolve in fixed orbits around the Sun.

   Because the Sun has the greatest gravitational force in the solar system.

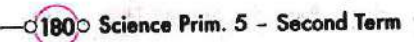
   • توجد ثمانية كواكب وحوالي 200 قمر تدور في مدارات محددة حول الشمس؛ لأن الشمس تمتلك أكبر جاذبية في المجموعة الشمسية.



Evaluate Your Learning!

» Put (✓) or (✗):

1. The Sun appears to be the biggest star to us. ( )
2. Most stars are made of solid rocks. ( )



Activity 12 How Do We Study the Stars?

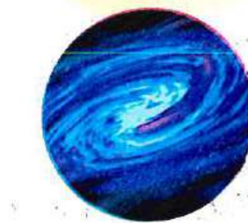


- If you look at the sky, you can see some celestial bodies with your naked eye.
- Most celestial bodies appear as small light dots, so we can't differentiate between them.





Universe → **Galaxies** → **Stars**





Universe

It is the wide space that contains celestial objects, such as galaxies, stars, planets, comets, meteors, and even human-made satellites, like the International Space Station.... etc.

الكون: هو الفضاء الشاسع الذي يضم عددًا ضخمًا من المجرات والنجوم والكواكب والمذنبات والنيازك وأقمار صناعية من صنع الإنسان مثل: محطة الفضاء الدولية، وغيرها من الأجرام الأخرى.

Galaxy



It is a group of stars, planets, and gases held together by gravity.

المجرة: تجمُّعات كبيرة من النجوم والكواكب والغازات مرتبطة ببعضها بواسطة الجاذبية.



Astronauts cannot be sent to study stars or other celestial bodies.

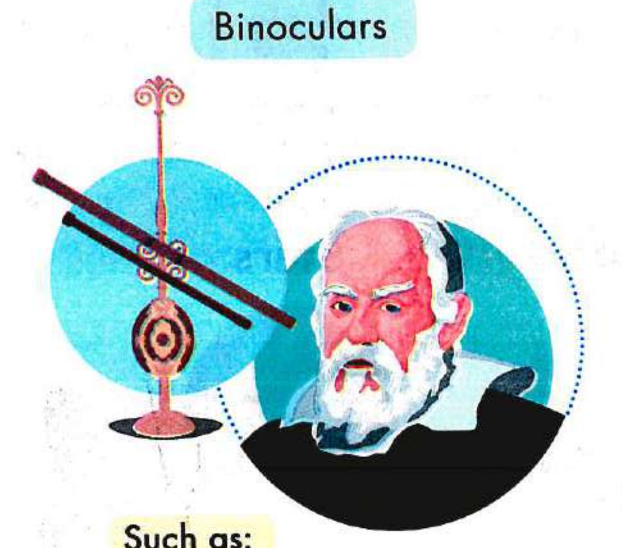
Because the universe is so big, and these celestial bodies are just too far away from Earth.

- لا يمكننا إرسال رواد الفضاء لدراسة النجوم والأجرام السماوية الأخرى؛ لأن تلك الأجسام شديدة البعد عن كوكب الأرض.

Using Technology to Study the Universe

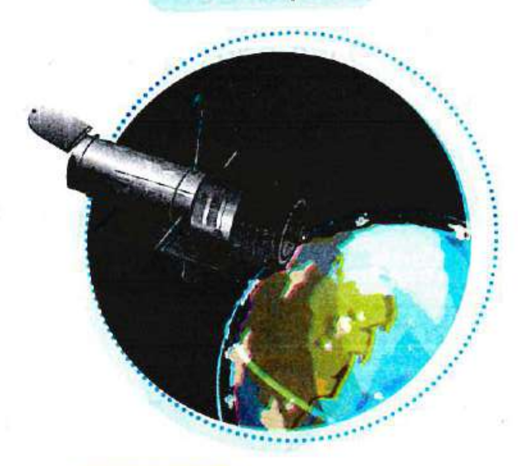
- Technology helps humans to invent tools that allow us to see distant celestial bodies in more details, such as:

Binoculars



Such as: **Galileo Binoculars**

Telescopes



Such as: **Hubble Telescope**

Importance of Binoculars and Telescopes

They help us take a closer look at too distant objects in greater details, such as:

1. The surface of the moon
2. Asteroids
3. Our neighboring planets
4. Stars in and out of our galaxy

أهمية المناظير (ثنائية العدسة) والتلسكوبات:

- تساعدنا على إلقاء نظرة عن قرب على الأجسام شديدة البعد عن كوكب الأرض، مثل: رؤية سطح القمر والكويكبات والكواكب المحيطة بالأرض والنجوم داخل أو خارج مجرتنا.



Some telescopes that are placed on the Earth's surface can't observe very distant celestial bodies.

Due to the presence of the atmosphere that acts like a protective layer around the Earth, as it lets some light waves pass through to Earth while it blocks other light waves.

- بعض التلسكوبات على سطح الأرض لا تستطيع رؤية الأجرام السماوية البعيدة؛ بسبب وجود الغلاف الجوي الذي يمثل طبقة حماية تحيط بكوكب الأرض؛ بحيث يسمح بنفاذ بعض الموجات الضوئية ويحجب الأخرى.

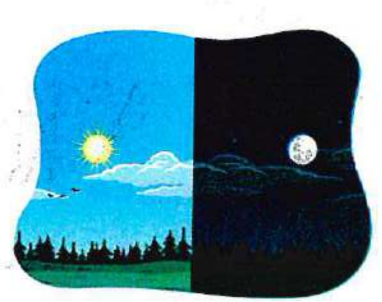


Activity 13 Record Evidence Like a Scientist: Day and Night

- In this concept, you have learned about the patterns of motion of different celestial bodies in the sky.
- Now, try to think like a scientist by writing your claim, evidence, and scientific explanation about one of the main points of this concept through the four steps you have learned in the first concept.

Question:

- What causes the cycle of day and night, and why do the Sun, planets, and stars appear to move across the sky?



My Claim:

- ....

....

Evidence:

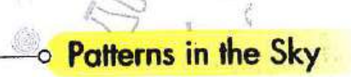
- ....

....

Scientific Explanation with Reasoning:

- ....

....





in Action

Activity 14 Planetarium Director and the Stars

» Did you know that you could see stars, planets, and constellations in one place?

Planetarium

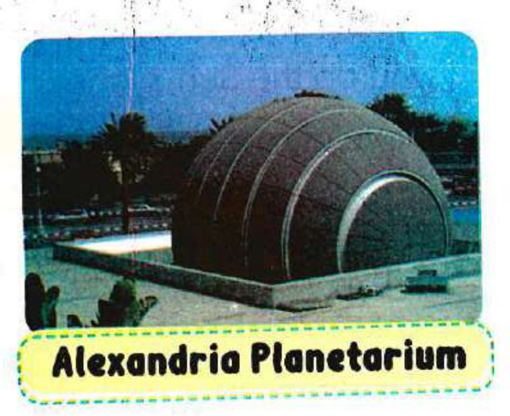
It is a place where you can see images of stars, planets, constellations, and other celestial bodies.

• هو مكان يمكنك من خلاله رؤية صور النجوم والكواكب والتجمعات النجمية والأجرام السماوية الأخرى.

Importance of Planetarium

• People can learn about space from planetariums.

• أهمية القبة السماوية: تساعد الأشخاص على دراسة الفضاء.



Alexandria Planetarium

How the Planetarium Works

① A projector displays images on its ceiling that looks like a dome.

② Special computer programs are used to show pictures of:

- What the sky looks like during certain times of the month or year.
- What the sky looked like many years ago.

كيفية عمل القبة السماوية:

• يوجد جهاز عرض في هذا المسرح الفضائي يعرض صُورًا على السقف الذي يشبه القبة.

• باستخدام برامج كمبيوتر خاصة، يمكنك رؤية كيف تبدو السماء خلال أوقات معينة من الشهر أو السنة، أو كيف كانت السماء في الماضي.

Concept 2

Planetarium Directors

- They are scientists who study the properties and **behavior** of celestial bodies in space, where:
  - They manage a planetarium building.
  - They are responsible for making an amazing, realistic show to bring outer space to Earth.



مسئولو العروض في القبة السماوية:

هم علماء يدرسون خصائص وسلوك الأجرام السماوية في الفضاء؛ حيث:

- يستعينون بمعرفتهم عن الفضاء لإدارة القبة السماوية.
- يتحملون أيضًا مسئولية محاكاة الفضاء الخارجي.

إنهم مسئولون عن تقديم عرض مذهل وواقعي لجلب الفضاء الخارجي إلى الأرض.



Evaluate Your Learning!

Put (✓) or (✗):

1. The planetarium contains pictures of stars and other celestial bodies. ( )
2. The projector of the planetarium displays images on a flat ceiling. ( )

Exercises on Lessons 5 and 6

Q1. Choose the correct answer:

1 The star that is present in our solar system is .... (Sohag 2023)

a. the moon b. the Sun c. Earth d. Jupiter

2 .... is/are located at the center of our solar system. (Cairo 2023)

a. The moon and the Sun
b. The moon and Earth
c. The Sun only
d. Earth only

3 The Sun is a ....-sized star. (Menofia 2023)

a. small b. medium c. large d. giant

4 .... has the greatest gravitational force in the solar system.

a. Jupiter b. The moon c. Earth d. The Sun

5 We can see .... at the night sky.

a. one moon and thousands of stars
b. the Earth and thousands of stars
c. the Sun and many moons
d. one star and one moon

6 The solar system includes ....

a. eight stars, one moon, and one planet
b. eight planets, one star, and one moon
c. eight planets and one star
d. one star and nine planets

7 .... give heat and light. (Dakahlia 2023)

a. Stars b. Moons c. Planets d. Satellites

8 Most of the heat and light energy of the Sun are produced due to the reaction between .... (Kafr El-Sheikh 2023)

a. hydrogen and rocks
b. hydrogen and helium
c. helium and sand
d. rocks and sand

9 We can see thousands of .... in the sky night that give off light and heat. (Port Said 2024)

a. moons b. stars c. planets d. satellites

10. The .... is a building with a dome ceiling and is used to see images of some celestial bodies. (Kafr El-Sheikh 2024)
    a. telescope   b. planetarium   c. constellation   d. ecosystem
11. The planetarium has a .... shaped ceiling.
    a. flat   b. triangular   c. rectangular   d. dome
12. Some telescopes on the Earth's surface can't observe distant celestial bodies due to the presence of ....
    a. sunlight   b. rocks   c. atmosphere   d. stars
13. All the following can be seen in the night sky, except ....
    a. moons   b. a planetarium   c. stars   d. meteors
14. In a planetarium, there is a .... that displays images of celestial bodies in space.
    a. television   b. camera   c. satellite   d. projector

Q2. Put (✓) or (✗):

1. The Sun is the biggest star in the universe. (Cairo 2023 - Alex. 2024) (   )
2. The Sun is necessary for the continuity of life on Earth. (Cairo 2023) (   )
3. The stars are far away from Earth. (Giza 2023) (   )
4. The Sun is a medium-sized star. (   )
5. The scientist Copernicus proved that the Earth is the center of the solar system. (Fayoum 2023) (   )
6. Stars, meteors, and satellites appear like dots in the night sky. (   )
7. The reaction between helium and hydrogen in the Sun gives off heat only. (   )
8. Stars are superhot gaseous spheres; most of them are helium and hydrogen. (Behiera 2023) (   )
9. The solar system contains thousands of stars. (   )
10. The atmosphere allows only some light waves to pass to the Earth. (   )
11. The International Space Station is a type of telescopes that are placed on the Earth's surface. (   )

12 Galileo binoculars help scientists see distant objects in space with more details. (Behiera 2024) (   )

13 Planetarium directors are responsible for managing a planetarium building. (   )

14 When you visit a planetarium, you can see pictures of moons, planets, and trees. (   )

Q3. Write the scientific term:

1 It is a group of stars, planets, and gases held together by gravity. (Alex. 2023 - Kafr El-Sheikh 2024) (..................)

2 It is a medium-sized star that is the center of the solar system. (Alex. 2023) (..................)

3 They are giant spheres of superhot gases; most of them are hydrogen and helium. (..................)

4 It is a special building with a dome celling and is used to see images of celestial bodies. (..................)

5 They are scientists that manage a planetarium building. (..................)

Q4. Complete the following sentences:

1 The wide space that contains celestial object is called a .... (Behiera 2023)

2 The solar system contains the Sun, eight ...., and more than 200 ....

3 The Sun produces .... energy, which warms the Earth. (Alex. 2023)

4 The .... is the protective layer around the Earth that allows some light waves to pass and blocks others.

5 A galaxy is a group of ...., planets, and gases held together by ....

6 The reaction between .... and .... gases inside the Sun gives off .... and heat.

7 Astronauts can't be sent to study stars because stars are ....

8 .... and .... are technological tools invented to see far celestial bodies.

9. Copernicus proved that the .... is the center of the solar system.

Q5. Give reasons for:

1. The Sun looks much larger to us than other stars. (Giza 2023)

....

....

2. Stars appear bright in the sky at night.

....

....

3. Some telescopes on the Earth's surface cannot observe very distant celestial bodies.

....

....

Q6. What happens if:

1. Hydrogen and helium gases are burned inside the Sun?

....

....

2. The Sun was made up of cold gases?

....

....

Q7. Study the following figure, then put (✓) or (✗):



1. The Sun is located in the center of the solar system. ( )
2. The Sun is considered a planet. ( )
3. The Sun gives off light only. ( )
4. The Sun has the biggest mass in the solar system. ( )
5. Earth is the only planet in the solar system. ( )
6. There is only one moon in the solar system. ( )

Q8. Study the figure below, then choose the correct answer:

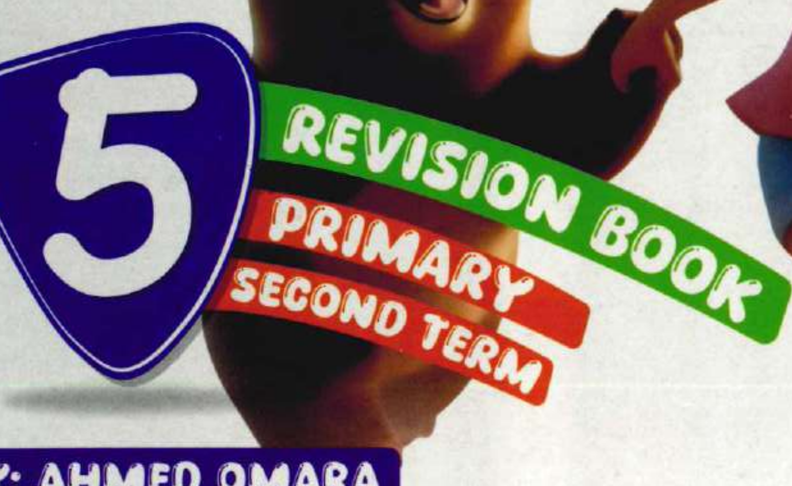


1. The previous figure represents a .... (satellite – planetarium)
2. We can see images of .... in this place. (rocks – planets)
3. The ceiling of this place has a .... shape. (dome – flat)



2025

SCIENCE



BY: AHMED OMARA

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Assessment 1 | Concept 3.1 | Lesson 1

Q1. (A) Choose the correct answer:

1. Water is used in all the following purposes, except ....
   a. recreation b. burning
   c. bathing d. manufacturing

2. .... is the part of the Earth's .... that is responsible for weathering of rocks.
   a. Rainwater - hydrosphere b. Wind - hydrosphere
   c. Rainwater - atmosphere d. Wind – biosphere

3. Water covers nearly .... of the Earth's surface.
   a. $\frac{1}{2}$ b. $\frac{3}{4}$ c. $\frac{1}{5}$ d. $\frac{1}{4}$

(B) What happens to:

- The water of a lake when the weather gets extremely hot?

....

....

Q2. (A) Put (✓) or (✗):

- Without the Earth's hydrosphere, the biosphere won't exist. (   )

(B) Write the scientific term:

1. The system that includes humans, animals, and plants on Earth. (........................)
2. The process of the transportation of small, broken rocks from one place to another by wind or water. (........................)

Q3. (A) Cross out the odd word:

- Nitrogen – Sand – Oxygen – Carbon dioxide (........................)

(B) Complete the following sentences:

1. Molten rocks are parts of the Earth's ....
2. .... includes both fresh water and salt water on Earth.

Assessment 2 | Concept 3.1 | Lesson 2

Q1. (A) Choose the correct answer:

1. Which of the following is found between porous of rocks below Earth's surface?
   a. Ice b. Groundwater c. Oceans d. Water vapor
2. Water evaporation on Earth show an interaction between .... and ....
   a. atmosphere – hydrosphere b. hydrosphere – biosphere
   c. biosphere – geosphere d. biosphere – atmosphere
3. All the following water bodies contain fresh water, except ....
   a. rivers b. groundwater c. rain d. oceans

(B) Give a reason for:

- Hiding of worms inside the soil is an example of an interaction between two of Earth's spheres.

....

Q2. (A) Correct the underlined word:

- Wind is considered part of the geosphere. (....................)

(B) Complete the following sentences:

1. .... is a water body that is surrounded by land.
2. Mountains are made of rocks, so mountains are part of the Earth's ....

Q3. (A) Put (✓) or (✗):

- A river flows from an area of lower place to an area with a higher place. (   )

(B) In the following figure, write the letter that describes the interaction between the following:

1. Leaves of acacia trees absorb carbon dioxide gas from the air. (.....)
2. A polar bear blends in with ice. (.....)



Assessment 3 | Concept 3.1 | Lesson 3

Q1. (A) Choose the correct answer:

1. The amount of the salt water is .... the amount of fresh water on Earth.
   a. smaller than b. larger than c. equal to d. half
2. All the following water bodies don't contain fresh water, except ....
   a. gulfs b. oceans c. seas d. rivers
3. Formation of lakes is an example of an interaction between .... and .... of the Earth.
   a. biosphere - hydrosphere b. geosphere – atmosphere
   c. atmosphere - biosphere d. hydrosphere - geosphere

(B) Give a reason for:

- Atmosphere is very important for plants.

....

Q2. (A) Cross out the odd word:

- Rivers – Rain water - Groundwater - Seas (....................

(B) Complete the following sentences:

1. The word "Bio" refers to ....
2. Nitrogen and oxygen gases make up most of the Earth's ....

Q3. (A) Put (✓) or (✗):

- Most of the fresh water on Earth is found in the form of liquid water in glaciers. (

(B) Write the scientific term:

1. A large area of the world that has similar soil, climate, plants, and animals. (....................
2. It's the type of water that forms about 96.5% of the Earth's hydrosphere. (....................

Assessment 4 | Concept 3.1 | Lesson 4

Q1. (A) Choose the correct answer:

1. Rivers and streams contain .... water, while ponds contain .... water.
   a. salt – fresh b. fresh – salt c. running – still d. still – running
2. Coral reefs are found in the .... of oceans.
   a. high-tide zone b. low-tide zone
   c. abyssal zone d. shallow area
3. An ocean has a shallow area that is called ....
   a. intertidal zone b. abyssal zone
   c. deep zone d. beach zone

(B) What happens to:

- Intertidal zones during low tides?

....

Q2. (A) Correct the underlined words:

- Water that covers most of the Earth's surface is <u>fresh water</u>. (....................)

(B) Complete the following sentences:

1. Some ponds and lakes may dry up in .... months.
2. Lake Assal contains .... water, while Lake Bardawil contains .... water.

Q3. (A) Put (✓) or (✗):

- Lake Nasser in Egypt contains fresh and running water. ( )

(B) Give reasons for:

1. There are no plants that can grow in the abyssal zones of oceans.

....

2. There is no fish that can survive in Lake Assal.

....

Assessment 5 | Concept 3.1 | Lesson 5

Q1. (A) Choose the correct answer:

1. Ponds contain .... and .... water.
   a. salt – still
   b. fresh – running
   c. fresh – still
   d. salt – running

2. .... are plants that can be grow in freshwater ecosystems, such as ....
   a. Water lilies - streams
   b. Kelps - oceans
   c. Moses - ponds
   d. Water lilies - ponds

3. .... can live in cool flowing water.
   a. Catfish
   b. Warms
   c. Waterlily
   d. Moses fish

(B) Give a reason for:

- Frogs and dolphins can't live in the same aquatic ecosystem.

....

Q2. (A) Put (✓) or (✗):

- Water of oceans is constantly moving in the form of waves. (   )

(B) Observe the following figure, then complete the following sentences:

- This living organsim is called ....
  and it can live in ....

Q3. (A) Cross the odd word:

- Starfish – Moses – Salmon - Dolphin (....................)

(B) Compare between:

	Salamander	Trout
Name of Aquatic Ecosystem	....	....

Assessment 6 | Concept 3.2 | Lesson 1

Q1. (A) Choose the correct answer:

1. .... include both swamps and ponds.
   a. Seas b. Rivers c. Lakes d. Wetlands
2. We can drink water from all the following sources, except ....
   a. rivers b. streams c. seas d. groundwater
3. .... are formed when water collects in low lying areas.
   a. Seas b. Worms c. Rivers d. Oceans

(B) What happens if:

- The river water meets the sea water.

....

....

Q2. (A) Put (✓) or (✗):

- Salt water can't be processed by living organisms. (   )

(B) Write the scientific term:

1. A large water body that is surrounded by land. (....................)
2. A water body that often starts at a mountain in the form of a stream. (....................)

Q3. (A) Correct the underlined word:

- We must take a quick shower to conserve <u>salt water</u>. (....................)

(B) Complete the following:

1. The floor of .... contains plateaus, mountains and plains.
2. When the water is stored in the cracks and spaces of underground rocks, ... is formed.

Assessment 7 | Concept 3.2 | Lesson 2

Q1. (A) Put (✓) or (✗):

1. More than 10 % of the world's animal species live in fresh water. ( )
2. We must conserve fresh water, because its amount is unlimited on Earth. ( )
3. When the rate of the rainfall on a river decreases, the river may dry up. ( )

(B) Mention three uses of fresh water:

....

....

Q2. (A) Choose the correct answer:

- The area of land where all the water flows in one direction to a common location as oceans is called ....

a. wetland b. estuary c. watershed d. tributary

(B) Complete the following sentences:

- When the rate of rainfall decreases, the level of water in rivers will ...., causing ....

Q3. (A) Correct the underlined word:

- <u>Watershed</u> is a structure that is built on a river to control and conserve water. (....................)

(B) Give reasons for:

1. The increase in rainfall rate on a river causes flooding.

....

....

2. Extinction of some species of fish and amphibians that live in freshwater habitats.

....

....

Assessment 8 | Concept 3.2 | Lesson 3

Q1. (A) Choose the correct answer:

1. Tributary usually ends by the flowing of its water into a bigger ....
   a. sea b. ocean c. lake d. river
2. The water of a big river may flow in all the following water bodies, except ....
   a. a bay b. an ocean c. a sea d. a stream
3. Dam can hold the water behind it, which causes a change in the .... of water in water bodies.
   a. quality b. type c. amount d. temperature

(B) Give a reason for:

- Farms near tributaries may cause water pollution.

....

Q2. (A) Put (✓) or (✗):

- Downstream is the place where a river starts. ( )

(B) Complete the following sentences:

1. .... are established across a river to hold water behind them.
2. Building a factory near a tributary causes .... of other water bodies connected to this tributary.

Q3. (A) Put (✓) or (✗):

- The water of tributaries flows directly into seas or oceans. ( )

(B) Observe the following figure, then answer the following questions:

A
B

1. The place (A) is called .... where the river starts.
2. What happens to:
   The water bodies in area (B) if a factory is buil in the area (A) that is using chemical fertilizers?

....

Assessment 9 | Concept 3.2 | Lesson 4

Q1. (A) Choose the correct answer:

1. Plastic spoons are made from products of ....
   a. oil b. tress c. animals d. paper

2. All the following are factors that affect resources sustainability, except ....
   a. pollution b. overpopulation
   c. damage of resources d. equal distribution of resources

3. .... and .... are among renewable natural resources.
   a. Trees – oil b. Coal – water c. Water – trees d. Oil – coal

(B) Write the scientific term:

- The action of controlling humans reaching of the natural resources or using them. (................................)

Q2. (A) Put (✓) or (✗):

- Clothes are made from plants, such as sheep. (   )

(B) Complete the following sentences:

1. Placing some cows in one large area of grass is an example of .... situation.
2. Overfishing leads to .... the number of fish in oceans and seas.

Q3. (A) Correct the underlined word:

- <u>Oil</u> products can be used to make paper. (................................)

(B) What happens if:

1. We burn a huge amount in fossil fuel to get energy?

....

....

2. Cutting down trees in a fast rate?

....

....

Assessment 10 | Concept 3.2 | Lesson 5

Q1. (A) Put (✓) or (✗):

1. Some human activities are responsible for water pollution. ( )
2. Wastewater engineers design tools to pollute water. ( )
3. The wastewater engineer designs ways to protect the community from floods. ( )

(B) What happens if:

- You mix clear water with small amount of mud?

....

....

Q2. (A) Choose the correct answer:

- Treated water is released into .... and .... after finishing its treatment process.

a. oceans – lakes
b. rivers – lakes
c. oceans – rivers
d. oceans – seas

(B) Complete the following sentences:

- .... can test the quality of the treated water by checking for the amount of .... in water.

Q3. (A) Correct the underlined word:

- The water that has already been used in homes and different industries is called <u>treated water</u>. (....................)

(B) Look at the following figure, then answer the questions:

1. This figure represents ....
2. The item number (1) represents .... , while item number (2) represents ....

Assessment 11 | Concept 4.1 | Lesson 1

Q1. (A) Choose the correct answer:

1. All planets in the solar systems revolve in fixed .... around the Sun.
   a. axes b. orbits c. tides d. poles
2. .... revolves around the Earth in a fixed orbit due to the Earth's gravity.
   a. Sun b. Mars c. Jupiter d. The moon
3. If there is no Earth's gravity, the moon would ....
   a. revolve faster around Earth b. still orbit Earth
   c. attract to Earth d. float off into space

(B) Give a reason for:

- The force of gravity has an important role in the solar system.

....

....

Q2. (A) Put (✓) or (✗):

- Gravity pushes the objects away from the center of the Earth. (   )

(B) Write the scientific term:

1. A force that pulls the objects down towards the Earth's surface is called ....
2. The moon moves around .... due to the gravity.

Q3. (A) Correct the underlined word:

- Objects move down from a height place toward the ground due to the effect of <u>magnetism</u>. (....................)

(B) Look at the following figure, then answer the questions:

1. The gravity of the moon is .... than the gravity of the Earth.
2. The gravity of the .... affects the ocean tides.

Moon

Earth

Assessment ⑫ | Concept 4.1 | Lesson 2

Q1. (A) Choose the correct answer:

1. Magnetism is a kind of .... force.
   a. attraction only   b. repulsion only
   c. visible   d. invisible
2. The gravitational force of an object .... as its mass decreases.
   a. increases   b. decreases
   c. equals zero   d. doesn't change
3. A person in a parachute flying in the sky is affected by .... a person standing on the Earth's surface.
   a. the same gravity of   b. more gravity than
   c. less gravity than   d. twice the gravity of

(B) What happens if:

- The mass of the moon increases twice?

....

Q2. (A) Put (✓) or (✗):

- Object moves under the effect of pull and push forces. (   )

(B) Complete the following sentences:

- Gravity between two objects depends on the .... of these objects and the .... between them.

Q3. (A) Correct the underlined word:

- Gravity is a kind of repulsion and attraction force. (....................)

(B) Which of the following balls has a greater gravity? and why?

....

....

....

....

Basketball
Mass = 500 g

Bowling ball
Mass = 4.5 kg

Assessment 13 | Concept 4.1 | Lesson 3

Q1. (A) Choose the correct answer:

1. Gravity depends on the .... of objects.
   a. color b. mass c. speed d. temperature
2. .... prevents us from floating off into space.
   a. Air resistance b. Gravity c. Magnetism d. Friction
3. Which of the following objects has the greatest gravitational force?
   a. The moon b. The Sun c. A magnet d. the Earth

(B) Give a reason for:

- You always land on the ground when you jump up.

....

Q2. (A) Put (✓) or (✗):

- All objects that have mass have gravitational force. (   )

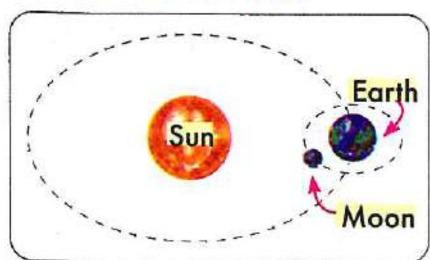
(B) Complete the following sentences:

- Gravity changes the .... of anything you throw up in the air.

Q3. (A) Correct the underlined word:

When a ball thrown in the air moves back toward the ground, its <u>mass</u> changes. (............................)

(B) Look at the following figure, then answer the following questions:



1. Arrange the following objects in the figure ascendingly according to their force of gravity.

....

2. What happens to the Earth if the Sun has no gravity?

....

Assessment 14 | Concept 4.1 | Lesson 4

Q1. (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Magnetism	a. pulls living organisms only toward its center.
2 Gravity	b. is a type of friction force that acts against the gravity.
3 Air resistance	c. could be a pulling or a pushing force.
1 .... 2 .... 3	

(B) What happens if:

- A metal ball and a feather are fallen down from a tower?

....

Q2. (A) Put (✓) or (✗):

- When pressing the bicycle brake, the bicycle stops due to the gravitational force between its brake and tires. ( )

(B) Write the scientific term:

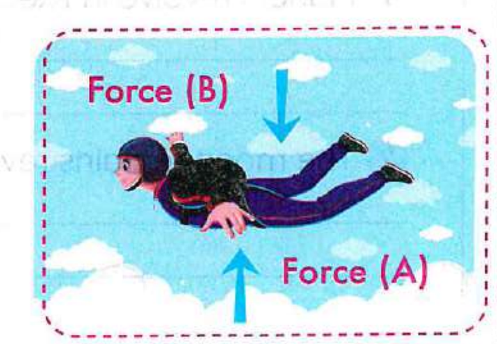
1. A tool that the skydiver uses to slow his drop to the Earth's surface. (..................)
2. A force between two objects in contact with each other, and it affects the opposite direction of the movement force.(..................)

Q3. (A) Cross out the odd word:

- Nickel – Cobalt – Wood – Iron (..................)

(B) Study the following figure, then answer the questions:

- In the absence of the force (A), the force (B) would ...., and the speed of the skydiver would ....



Assessment 15 | Concept 4.1 | Lesson 5

Q1. (A) Choose the correct answer:

1. The solar system consists of ....
   a. the Sun and moon only
   b. the Sun and group of planets
   c. the Sun and Earth only
   d. a group of planets only

2. The force of .... keeps the planets on their paths around the Sun.
   a. air resistance
   b. friction
   c. gravity
   d. electricity

3. The center of solar system is the ....
   a. the Sun
   b. Mars
   c. the Earth
   d. the moon

(B) What happens to:

- The planets if the Sun's gravity disappear?

....

....

Q2. (A) Put (✓) or (✗):

- Copernicus stated that the Sun revolves around the Earth. (   )

(B) Complete the following sentences:

- In the solar system, all ...., such as Earth revolves in fixed paths called .... around the Sun.

Q3. (A) Correct the underlined word:

- The Earth revolves around the sun in <u>rectangular</u> shaped orbit.

(........................)

(B) Give a reason for:

1. Planets revolve in fixed orbits around the Sun.

....

....

2. The moon remains revolving around the Earth in a fixed orbit.

....

....

Assessment 16 | Concept 4.2 | Lesson 1

Q1. (A) Choose the correct answer:

1. Day and night phenomena occurs due to the rotation of the Earth around ....
   a. the Sun b. the moon
   c. the solar system d. its axis
2. The Sun rises in .... and sets ....
   a. south – north b. west – east
   c. east – west d. north – south
3. The Earth rotates on its axis once every ....
   a. 24 days b. 24 hours c. 365 days d. 365 hours

(B) Give a reason for:

- The occurrence of day and night.

....

Q2. (A) Put (✓) or (✗):

- Half of the Earth appears dark at night as it doesn't receive any light. ( )

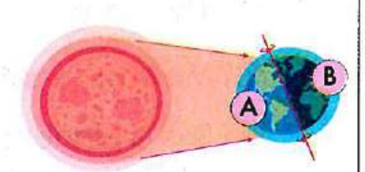
(B) Write the scientific term:

1. The spinning of Earth on its axis. (....................................)
2. An imaginary line passing through the two poles of Earth. (....................................)

Q3. (A) Correct the underlined word:

- The orbiting of Earth around the Sun is called <u>rotation</u>. (....................................)

(B) Study the following figure, then complete:



1. The part (A) of the Earth has .... as it faces the Sun.
2. If the Earth stops spinning on its axis, the phenomenon of .... won't occur.

Assessment 17 | Concept 4.2 | Lesson 2

Q1. (A) Choose the correct answer:

1. Earth rotates on its axis in anticlockwise direction from .... to ....
   a. east – west
   b. west – north
   c. east – south
   d. west – east
2. The cycle of .... results from the revolution of the Earth around the Sun.
   a. seasons
   b. moon phases
   c. night only
   d. day and night
3. A city in the west of Egypt sees the sunrise .... that in a city in the east of Egypt.
   a. before
   b. after
   c. at the same time of
   d. earlier

(B) What happens to:

- The direction from which the Sun rises if Earth spins clockwise on its axis?

....

Q2. (A) Put (✓) or (✗):

- The length of day during winter is equal to its length during summer. ( )

(B) Complete the following sentences:

1. The Earth orbits around the Sun in .... orbit.
2. .... is the fastest planet that rotates on its axis in the solar system.

Q3. (A) Correct the underlined word:

- The Earth rotates around its axis once every <u>28 hours</u>. (............)

(B) Write the scientific term:

1. It is a planet that takes 24 hours to make a complete rotation on its axis. (............)
2. It is located in the center of the solar system. (............)

Assessment 18 | Concept 4.2 | Lesson 3

Q1. (A) Choose the correct answer:

1. The shortest shadow of an object happens ....
   a. in the morning b. in the afternoon
   c. at noon d. at night
2. Constellations appear .... in the sky during the year.
   a. at different positions b. at the same position
   c. in winter only d. in summer only
3. Knowing the position of constellations in the sky, helps us to know the ....
   a. sunrise direction b. sunset direction
   c. Earth's main directions d. moon's directions

(B) Give a reason for:

- We cannot feel the high speed of the Earth's rotation.

....

Q2. (A) Put (✓) or (✗):

- Every night, new stars appear from east at the sky due to the Earth's rotation on its axis. (   )

(B) Write the scientific term:

1. The first timepiece that was used by ancient Egyptians to know the time. (....................)
2. A group of stars that forms a pattern in the sky. (....................)

Q3. (A) Correct the underlined word:

- The cycle of day and night is due to Earth's movement around the Sun. (....................)

(B) From the opposite figure:

1. This figure represents constellation ....
2. This constellation is given that name by ancient Greeks relative to a mythical ....

Assessment 19 | Concept 4.2 | Lesson 4

Q1. (A) Choose the correct answer:

1. .... are celestial bodies that make their own light.
   - a. Earth and Jupiter
   - b. The Sun and stars
   - c. The Sun and the moon
   - d. Earth and the Sun
2. The moon phase in which an edge of the moon face is illuminated is called ....
   - a. new moon
   - b. crescent
   - c. gibbous
   - d. full moon
3. If the stars were made up of cold gases, they would ....
   - a. seem more shiny
   - b. give off more light
   - c. seem dark
   - d. seem bigger

(B) Give a reason for:

- The moon is a dark body but we see it shiny at night.

....

Q2. (A) Correct the underlined words:

- Stars are made up of <u>cold liquids</u>. (..................)

(B) Complete the following sentences:

1. Half of the moon face can be seen illuminated in the .... phase.
2. The moon has different phases due to the movement of the moon around the Earth once each .... month.

Q3. (A) Put (✓) or (✗):

- The full moon phase occur at the middle of the lunar month. (   )

(B) Write below each diagram the name of the moon phase a person on Earth would see:

Sunlight → Moon Earth

....

Sunlight → Earth Moon

....

Assessment 20 | Concept 4.2 | Lessons 5 & 6

Q1. (A) Choose the correct answer:

1. The only star in our solar system is ....
   a. the moon b. the Sun c. Earth d. Jupiter
2. .... is a building used to see images of some celestial bodies.
   a. Telescope b. Constellation
   c. Planetarium d. Ecosystem
3. .... is the wide space that contains celestial objects such as galaxies, stars, and planets.
   a. Solar system b. Constellations
   c. Planetarium d. Universe

(B) Give a reason for:

- The Sun is considered as a star.

....

....

Q2. (A) Put (✓) or (✗)

- Galileo binoculars help scientists to see distant objects in space with more details. (   )

(B) Complete the following sentences:

1. The ceiling of a planetarium has a .... shape.
2. Sun is a .... sized star.

Q3. (A) Correct the underlined word:

- Solar system is a group of stars, planets, and gases held together by gravity. (....................)

(B) Mention the two gases of which the Sun is made?

1. ....
2. ....

Concept 3.1 Biosphere and Hydrosphere Interactions

1 Summary of Concept 1



Earth's Systems

- Scientists divided the Earth into four main systems (spheres).

1 Biosphere:

- It is the system that includes all living organisms on Earth.

Examples:

- Humans
- Animals
- Plants
- Birds
- Fish
- Insects
- Microorganisms



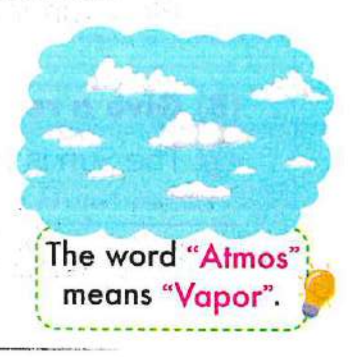
The word "Bio" means "Life".

2 Atmosphere:

- It is the system that includes all the gases that surround the Earth.

Examples:

- Oxygen gas
- Carbon dioxide gas
- Water vapor
- Nitrogen gas



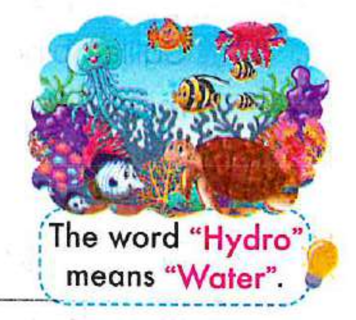
The word "Atmos" means "Vapor".

3 Hydrosphere:

- It is the system that includes all of the water on, under, and above the Earth's surface.

Examples:

- Oceans
- Seas
- Rivers
- Groundwater
- Glaciers



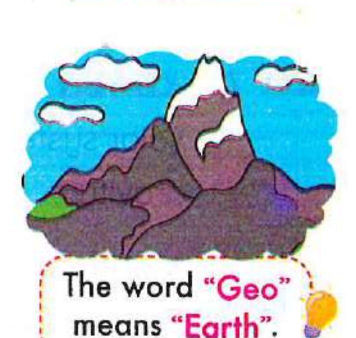
The word "Hydro" means "Water".

4 Geosphere "Lithosphere":

- It is the system that includes rocks, sand, soil, and minerals.

Examples:

- Rocks, sand, and soil on Earth
- Molten rocks and minerals inside Earth
- Landforms (mountains – canyons – valleys – dunes)



The word "Geo" means "Earth".

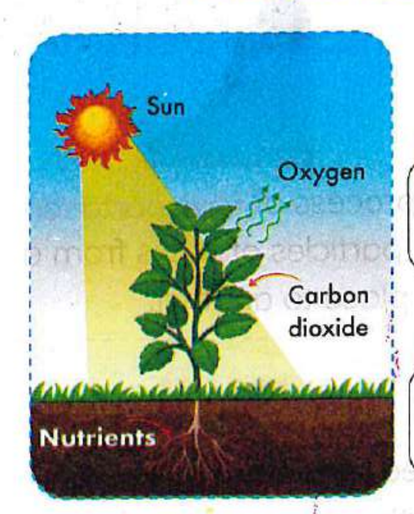
Biome

Biome: It is a large area of the world that has similar soil, climate, animals, and plants (wildlife).

Examples:

- Deserts
- Forests
- Rainforests
- Grasslands
- Wetlands

Earth's Systems Interactions



During Photosynthesis

Biosphere is interacting with atmosphere:

Plants take in carbon dioxide from the air.

Atmosphere interacting with geosphere:

Plants take nutrients from the soil.

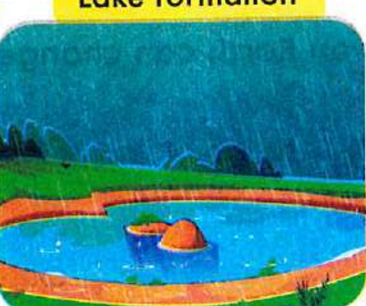
An interaction between hydrosphere and geosphere:

Examples:

Erosion of rocks by water



Lake formation



Biosphere interacting with hydrosphere:

Examples:

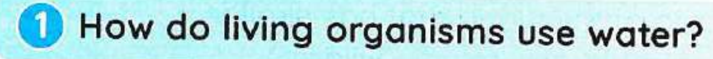
- Humans and animals drink water to survive.
- Plants need water to make their own food.
- Some plants and animals live in water.

Uses of Water

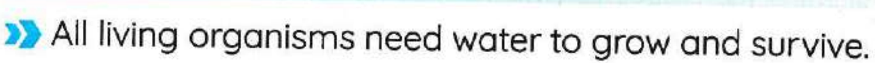
- Transportation
- Manufacturing
- Traveling
- Cleaning
- Bathing
- Recreation



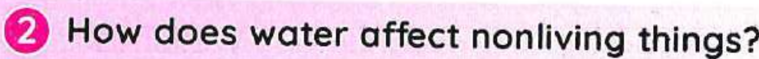
Water Impacts

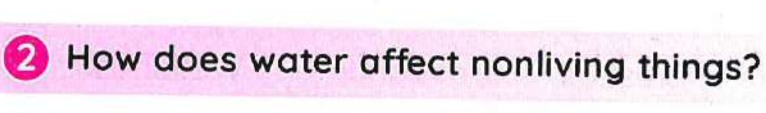


1 How do living organisms use water?



» All living organisms need water to grow and survive.





2 How does water affect nonliving things?

» Water has an impact on the Earth's surface through two processes:

Weathering

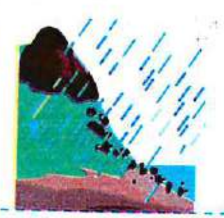


It is the process of breaking down of rocks into smaller particles.

then



Erosion



It is the process of transportation of small particles of rocks from a place to another.

The Amount of Water on Earth

- Nearly three-quarters (71%) of the Earth is covered by water.
- Salt water forms about 96.5% of the water on Earth.
- Fresh water forms 3.5% of the water on Earth.
- Water is everywhere, in lakes, rivers, seas, oceans, and underground.
- The total amount of water on Earth does not change, even if its state changes.
- We cannot make new water, but we can recycle it.

Water in bodies of water on Earth can change from a liquid state into:



A solid state (ice) by freezing in extreme cold weather.



A gaseous state (water vapor) by evaporation in extreme hot weather.

Bodies of Water

Body of Water	Definition
Lake Most lakes contain fresh water. Some lakes contain salt water.	It is a large body of water that is surrounded by land.
River (Fresh water)	It is a body of water that flows from an area of higher place to an area of lower place in a definite path.
Groundwater (Fresh water)	It is the water that lies under the Earth's surface due to the leakage of water into the Earth through a layer of porous rocks.
Oceans and Seas (Salt water)	They are very large bodies of water that always contain salt water.

Species in Aquatic Ecosystems

P.O.C	Ponds	Streams	Oceans and Seas
Type of Water	Fresh water	Fresh water	Salt water
Water Movement	Still water	Running water (Cool and flows fast)	Constantly moving in the form of waves
Species	• Water lilies • Some worms • Salamanders • Frogs	• Catfish • Salmon (Trout)	• Kelps • Dolphins • Starfish • Flounder fish (Moses fish)

Aquatic Ecosystems

- Aquatic ecosystems include saltwater ecosystems and freshwater ecosystems



1 Saltwater Ecosystems

(Oceans and Seas)

Shallow Areas

- These areas contain coral reefs and intertidal zones.

• Intertidal Zone

It is the area along the coast that disappears underwater at the high tide and appears at the low tide.

Deepest Areas

- These areas are called abyssal zones.

• Abyssal Zones

They are very deep areas in oceans where sunlight cannot reach them.

2 Freshwater Ecosystems

Still Water (Ponds and Lakes)

- In many ponds and lakes, the water is present all year.
- Some other ponds and lakes dry up in the hot summer months.

Flowing Water (Streams and rivers)

- Streams are small bodies of flowing water.
- Many different plants and animals live in moving water.

Lakes may contain salt water or fresh water.

Examples of Saltwater Lakes:

- Lake Bardawil in Egypt
- Lake Assal in Djibouti, which has high concentration of natural salts, so:
  - Fish can't live in it.
  - There're few plants that grow in it.
  - Many types of bacteria live in it.

Examples of Freshwater Lakes:

- Lake Nasser in Egypt

2 Definitions of Concept 1

Geosphere	- It is the Earth's system that includes rocks, sand, and soil.
Atmosphere	It is the Earth's system that consists of a mixture of different gases surrounding the Earth, such as oxygen, nitrogen, and carbon dioxide.
Biosphere	It's the Earth's system that includes all living organisms, such as microorganisms, plants, animals, and humans.
Hydrosphere	It's the Earth's system that includes all fresh water and salt water on Earth.
Weathering	It is the process of breaking down of rocks into smaller particles by rain, wind, or temperature
Erosion	It is the process of transportation of small particles of rocks to another place by water or wind.
Oceans and Seas	They are very large bodies of water that contain salt water.
Lake	It is a lárge body of water that is surrounded by land.
River	It is a body of water that contains fresh water and it always flows from an area of a higher place to an area of a lower place.
Groundwater	It is the fresh water stored under the Earth's surface between the cracks and spaces of porous rocks.
Biome	It is a large area of the world that has similar soil, climate, animals, and plants (wildlife).
Intertidal zone	It is the area along the coast that disappears underwater at the high tide and appears at the low tide.
Abyssal zones	They are very deep and dark areas in oceans where sunlight cannot reach them.
Salt water	It is a type of water which forms about 96.5% of water on Earth.
Fresh water	It is a type of water which forms 3.5 % of water on Earth.

3 Give Reasons For... Concept 1

1. **Water is important for all plants on Earth.**
   - Because plants need water to make their food through the photosynthesis process.
2. **Water affects nonliving things, such as rocks.**
   - Because water causes weathering and erosion of rocks.
3. **Plants are among the renewable resources on Earth.**
   - Because plants can be planted from seeds that grow up and form new plants.
4. **Our planet looks like a blue marble from space.**
   - Because nearly three-quarters of the Earth's surface is covered with water.
5. **The total amount of water on Earth does not change.**
   - Due to the water cycle, water in bodies of water evaporates, condenses to form clouds, and then returns to the Earth's surface as rain.
6. **Scientists name each of the four Earth's systems using the word "sphere".**
   - Because the shape of Earth is very close to a sphere.
7. **The hiding of worms inside the soil is an example of an interaction between two of Earth's spheres.**
   - Because worms are a part of the biosphere and soil is a part of the geosphere.
8. **Respiration process in humans is one of the examples for interactions between two of Earth's systems.**
   - Because humans belong to the biosphere, and they take oxygen and release carbon dioxide during respiration from the atmosphere.
9. **There're no plants in abyssal zones.**
   - Because abyssal zones are very deep, so sunlight can't reach them.
10. **There're no fish that can live in Lake Assal.**
    - Because Lake Assal contains a high concentration of natural salts.

4 What Happens...? Concept 1

1. To the intertidal zones during high tides?
   - Intertidal zones disappear.
2. To the intertidal zones during low tides?
   - Intertidal zones appear.
3. To the water of a lake when the weather gets extremely hot?
   - Water evaporates and turns into water vapor.
4. To the water of a lake when the weather gets extremely cold?
   - Water freezes and turns into ice.
5. To the biosphere when there's no hydrosphere on the Earth?
   - The biosphere disappears.

5 Exams on Concept 3.1

Model Exam 1

Q1. (A) Choose the correct answer:

1. Rocks are broken down into smaller particles during the .... process.
   a. photosynthesis b. weathering
   c. erosion d. respiration
2. All the following are components of the hydrosphere, except ....
   a. rivers b. groundwater c. grass d. lakes
3. The carbon dioxide we exhale is a part of the Earth's ....
   a. hydrosphere b. biosphere c. atmosphere d. geosphere

(B) Give a reason for:

- Water affects nonliving things like rocks of the Earth's surface.

....

....

Q2. (A) Put (✓) or (✗):

- Deserts, rainforests, grasslands, and wetlands are examples of biomes ( )

(B) Write the scientific term:

1. It is an area of the ocean that contains coral reefs and intertidal zones (................)
2. It is a body of water that is surrounded by land. (................)

Q3. (A) Cross out the odd word:

- Kelps – Flounder fish – Starfish – Catfish (................)

(B) Complete the following sentences:

1. The water of a lake .... in extreme hot weather.
2. Water and plants are natural .... resources.

Model Exam 2

Q1. (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Rivers	a. is a saltwater body surrounded by land.
2 Abyssal zone	b. always contain fresh water.
3 Lake Assal	c. is an area of the ocean that doesn't receive any sunlight.
1 .... 2 .... 3	

(B) Give a reason for:

- Most of the fresh water on Earth can't be used for drinking.

....

....

Q2. (A) Cross out the odd word:

- Lake Assal – Lake Nasser – Lake Bardawil – Red Sea (....................)

(B) Complete the following sentences:

1. The .... is responsible for maintaining the water amount constant on Earth.
2. When plants release oxygen gas, there's an interaction between the .... and the atmosphere.

Q3. (A) Correct the underlined word:

- Groundwater is a part of the <u>geosphere</u>. (....................)

(B) Mention one example for:

1. A plant that grows in ponds: ....
2. A freshwater lake: ....

Model Exam 3

Q1. (A) Choose the correct answer:

1. Glaciers are considered part of the Earth's ....
   a. geosphere b. hydrosphere c. atmosphere d. biosphere
2. .... belong to the biosphere and could live in an ocean ecosystem.
   a. Salamanders b. Kelps c. Frogs d. Salmons
3. All the following are parts of the Earth's geosphere, except ....
   a. rocks b. sand c. mountains d. groundwater

(B) Give a reason for:

- The hiding of worms inside the soil is an example of an interaction between two of Earth's spheres.

....

Q2. (A) Put (✓) or (✗):

- Both streams and ponds have fresh and still water. (   )

(B) Write the scientific term:

1. It is the process of the transportation of small, broken rocks from one place to another by wind or water. (....................)
2. They are large saltwater bodies in which water circulates around the world in the form of waves. (....................)

Q3. (A) Correct the underlined word:

- Frogs are among the animals that can live in saltwater.

(....................)

(B) From the following figure:

1. The label (1) is a part of the Earth's ....
2. What happens to the state of label (2) when the weather becomes very hot?

....

....

....

Model Exam 4

Q1. (A) Choose the correct answer:

1. No plants can survive in abyssal zones as .... can't reach it.
   a. water b. wind c. soil d. sunlight

2. Water is used in all the following purposes, except ....
   a. cooking b. burning
   c. bathing d. manufacturing

3. When the water of a lake evaporates, there's an interaction between the .... and the ....
   a. biosphere – hydrosphere b. atmosphere – geosphere
   c. hydrosphere – atmosphere d. biosphere – atmosphere

(B) What happens to:

- The biosphere when there's no hydrosphere on the Earth?

....

Q2. (A) Cross out the odd word:

- Rain water – Glaciers – Seas – Rivers (....................)

(B) Complete the following sentences:

1. The .... is the area along the coast that disappears underwater at high tide.
2. The Earth's .... is a mixture of gases, such as oxygen and nitrogen.

Q3. (A) Put (✓) or (✗):

- Water lilies are parts of the biosphere that can live in streams. (   )

(B) Compare between:

	Dolphins	Salmons
Name of the Aquatic Ecosystem	....	....

Model Exam 5

Q1. (A) Choose the correct answer:

1. All the following species live in fresh water, except ....
   a. frogs b. catfish c. salamanders d. starfish

2. The weathering of rocks by water represents an interaction between the .... and the ....
   a. biosphere – hydrosphere b. hydrosphere – geosphere
   c. hydrosphere – atmosphere d. atmosphere – geosphere

3. The percentage of fresh water on the Earth is ....
   a. 96.5% b. 71% c. 3.5% d. 29%

(B) What happens to:

- Intertidal zones during high tides?

....

Q2. (A) Put (✓) or (✗):

- The water in ponds is cooler than that in streams. ( )

(B) Complete the following sentences:

1. A rat that digs a burrow in the soil represents an interaction between the biosphere and the ....
2. The ocean water circulates around the world in patterns called ....

Q3. (A) Correct the underlined word:

- The <u>hydrosphere</u> is the system that includes plants, animals, and humans on Earth. (................)

(B) Mention the name of the water ecosystem and the type of water where the animal in the following figure lives.

1. Name of the ecosystem: ....
2. Type of water: ....

Concept 3.2 Water as a Valuable Natural Resource

1 Summary of Concept 2

- There are many natural resources on Earth, such as water, plants, and metals.
- Most of the water on Earth is salt water.
- We must conserve fresh water and protect it from pollution.

Sources of Water

Salt Water	Fresh Water		Mixture of Salt and Fresh Water
• Oceans	• Rivers	• Streams	• Estuaries
• Seas	• Glaciers	• Groundwater	
• Some lakes	• Wetlands	• Most lakes	

Uses of Water

» In Egypt, water can be used in many purposes, such as:

- Generating electricity (in Aswan High Dam)
- Agriculture

» Around the world, many people work on the water by:

- Fishing
- Transporting goods

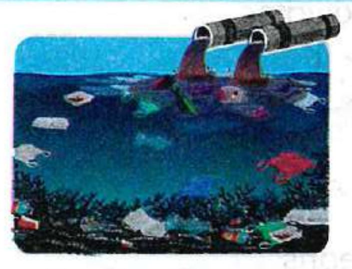
Risks that Threaten Fresh Water

1 Scarcity of fresh water



The scarcity of fresh water threatens the survival of living organisms.

2 Poor quality of fresh water

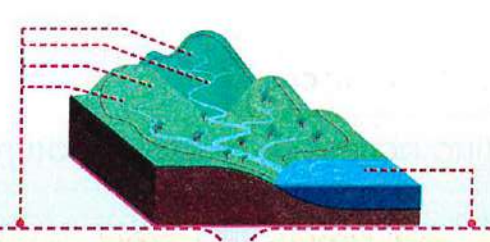


The poor quality of fresh water leads to the death or extinction of some species of fish and amphibians.



Bodies of Water

Body of Water	Type of Water	Location	Other Information
Rivers	Fresh water	• Start in: mountains as streams. • End in: seas, or larger rivers.	
Lakes	• Most have fresh water. • Some have salt water.	They are formed when water is collected in low-lying areas.	A lake is a large body of water surrounded by land.
Wetlands	Fresh water	A land that is partially covered with water.	Types of wetlands: • Swamps (marches) • Ponds (bogs)
Estuaries	A mixture of fresh water and salt water	An estuary is formed when a river meets an ocean or a sea.	Estuaries are homes to thousands of plants and animals.
Groundwater	Fresh water	It is the water stored in the cracks and spaces of underground rocks.	
Oceans	Salt water	They are large bodies of water that surround the continents.	• All oceans are connected to each other. • The ocean's floor has mountains, plains, and plateaus.



Tributaries: They are small bodies of water, such as small creeks or streams, that flow into larger rivers.

Watershed: It is an area of land where all the water from different sources flows towards a common location.

Tributaries (Small creeks or streams) → Flow in → **Big rivers** → Flow in → **Larger bodies of water** (Bays, seas, or oceans)

- Rivers start upstream and end downstream.
- What happens upstream will affect the bodies of water downstream.

The Effect of Rain on a Body of Water



If	Then
There is more rainfall than a river or a stream can handle.	The water level will increase, causing flooding.
There is too little rainfall on a river or a stream.	The water level will decrease, causing drought.



- Watershed maps can help scientists understand how bodies of water interact with each other.

Scenario	Result
If a factory is established near a tributary,	This affects the water quality, where it causes water pollution of other bodies of water connected to this tributary.
If a farm near a tributary uses chemical fertilizers,	
If wind blows waste from a trash dump into the water of a tributary,	
If dams are built across a tributary,	This affects (changes) the water amount in other tributaries connected to this tributary.



1 Preservation of resources

- It means restricting access to or use of natural resources.

Examples of resources preservation

1. Ras Mohammed Protectorate (In South Sinai)
2. Wadi Al-Hitan Protectorate (In Fayoum)

Examples of the results of (depletion) of natural resources more quickly than they can be replaced

1. Overfishing (Causes the decrease of the number of fish in oceans and seas)
2. Overusing groundwater (Causes running out of the groundwater that leads to the drying up of wells)

2 Sustainability

- It means using resources in a way that does not negatively affect the future supply of these resources.



Sustainable Situation

Cows are placed in one large area of grass.

- The grass will grow back in other areas.
- Cows will still have more food.



Unsustainable Situation

Cows are placed in many small areas of grass.

- The grass will disappear in these small areas.
- Cows will be hungry.

The resources sustainability is affected by:

- Overpopulation
- Pollution
- Overusing the resources
- Unequal distribution of resources

Recycling Water


The Water Cycle

- Solar energy drives the water cycle in nature.
- Humans can recycle wastewater and reuse it in many purposes.

Wastewater:

It is the water that has already been used in homes and different industries.

Recycling water:

It is the process of removing waste materials from water.

Wastewater engineers

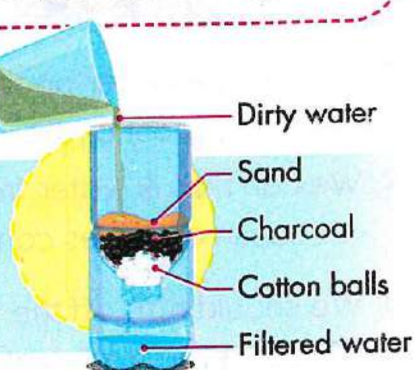
- They are specialized scientists who work in water treatment plants, such as Bahr Al-Baqar wastewater treatment plant in Egypt.

Roles of Wastewater Engineers in Recycling Wastewater

1. They decide where to build water treatment facilities.
2. They check the water quality by checking the amounts of pollutants in the treated water.
3. They test the treated water to make sure it is safe to use before it is released into rivers and lakes.
4. They design ways to protect a community from floods.
5. They calculate the amount of drinking water that a community needs.

Filter model:

It helps us remove harmful materials from the polluted water.



2 Definitions of Concept 2

Water	It is the basic liquid matter that all living organisms need to survive.
Watershed	It is an area of land where all the water from different sources flows towards a common location.
Tributaries	They are small bodies of water, such as small creeks or streams that flow into bigger rivers.
Wetland	It is an area that is partially covered with water.
Dam	It is a building built across a river to control the flow of water by holding water behind it.
Preservation	- It means restricting access to or use of natural resources. - It means preventing the use or development of natural resources in specific areas.
Sustainability	It means managing the use of natural resources without affecting their amount in future negatively.
Wastewater	It is the water that has already been used in homes and different industries.
Wastewater engineers	They are scientists who work in water treatment plants.
Recycling water	It is the process of removing waste materials from water.

3 Give Reasons For... Concept 2

1. Most of the water on the Earth's hydrosphere is undrinkable.
   - Because most of the water on the Earth's surface is salt water.
2. We can't drink water from estuaries.
   - Because estuaries contain a mixture of fresh water and salt water.
3. We should turn off the water while brushing our teeth and washing dishes.
   - To conserve fresh water.

4. The water of an estuary is a mixture of salt water and fresh water.
   - Because it is formed when the fresh water of a river meets the salt water of an ocean or a sea.

5. The poor quality of water has a dangerous effect on all living organisms.
   Because the poor quality of fresh water causes the death or excitation of some species of fish and amphibians living in this water.

6. Watershed maps are important.
   - Because watershed maps help scientists understand how bodies of water interact with each other.

7. Farms near tributaries may cause water pollution.
   - Because the waste of these farms is carried by the water of tributaries to other bodies of water connected to them.

8. There are many things that affect the sustainability of resources.
   - Because resources sustainability is affected by overpopulation, pollution, or unequal distribution of resources.

9. Placing cows in a big area of grass is a sustainable situation.
   - Because the grass will grow back in other areas, so the cows will still have more food.

10. Placing cows in many small areas of grass is an unsustainable situation.
    - Because the cows will eat all the grass before the new grass grows back, which makes the grass disappear in these areas, and the cows will be hungry.

11. Protected areas are established in some places.
    - To preserve natural resources from being depleted.

12. Humans create many methods to recycle wastewater.
    - To reuse water for many purposes.

13. Wastewater engineers test the treated water before the water is released in rivers and lakes.
    - To make sure that the water is safe to be used.

4 What Happens If...? Concept 2

1 The water of a river meets the water of a sea?
- An estuary is formed.

2 People don't conserve fresh water?
- We can't find fresh water to drink.

3 Water is collected in a low-lying area?
- A lake is formed.

4 There is a lot of rainfall on a river?
- The water level will rise in this river, causing flooding.

5 There's too little rainfall on a river?
- The water level in this river decreases, causing drought.

6 A factory is established near a tributary?
- The waste of the factory is carried by the water to downstream areas.

7 We burn huge amounts of fossil fuels, such as coal and oil?
- It causes water and soil pollution, which causes the death of many living organisms.

8 People use water from wells at a faster rate than it is replaced by rain?
- The groundwater may run out, causing wells to dry up.

9 We cut down trees in a fast rate?
- It may lead to deforestation, which increases the soil erosion by water and wind.

10 The quality of fresh water becomes poor?
- It causes the death or excitation of some species of fish and amphibians living in this water.

11 You mix clear water with a small amount of mud?
- The water becomes dirty.

12 A farm near a tributary uses chemical fertilizers?
- The waste of the farm will be carried by the tributary water to other bodies of water connected to it, causing water pollution.

5 Exams on Concept 3.2

Model Exam 1

Q1. (A) Choose the correct answer:

1. .... is formed when the water of a river meets the water of a sea.
   a. An estuary b. A lake c. An ocean d. A wetland
2. .... of fresh water may cause the extinction of some amphibians.
   a. Conservation b. Poor quality
   c. Recycling d. High quality
3. Plastic cups are made from ....
   a. oil products b. trees
   c. animal products d. paper

(B) Give a reason for:

- We should turn off the water while washing dishes.

....

Q2. (A) Put (✓) or (✗):

- Downstream is the place where a river starts. ( )

(B) Complete the following sentences:

1. The amount of salt water on the Earth is .... than the amount of fresh water.
2. If a farm near a tributary uses chemical fertilizers, this causes .... to the bodies of water near it.

Q3. (A) Correct the underlined word:

- Overfishing leads to <u>increasing</u> the number of fish in oceans and seas. (....................)

(B) Mention two parts of the geosphere found in the floor of an ocean.

1. .... 2. ....

Model Exam 2

Q1. (A) Choose the correct answer:

1. All the following materials can be used to filter wastewater in a simple water filter, except ....
   a. cotton b. sand c. wood d. charcoal
2. .... is a land partially covered with water.
   a. An ocean b. An estuary c. A wetland d. A lake
3. Humans can get the freshwater they need from all the following resources, except ....
   a. rivers b. seas c. groundwater d. streams

(B) Write the scientific term:

- It is the act of controlling human access to natural resources or their usage. (....................)

Q2. (A) Correct the underlined word:

- Cotton, charcoal, and mud can be used in making a simple water filter. (....................)

(B) What happens if:

1. We cut down trees in a fast rate?

   ....

2. Water is collected in a low-lying land?

   ....

Q3. (A) Put (✓) or (✗):

- The water of a small creek flows directly into a sea or a gulf. (   )

(B) Complete the following sentences:

1. The .... process is used to get filtered water from polluted water.
2. The basic liquid matter which is needed by humans, animals, and plants to survive is ....

Model Exam 3

Q1. (A) Choose the correct answer:

1. Frogs can survive in freshwater ecosystems, such as ....
   a. seas   b. oceans
   c. rivers   d. ponds
2. All the following are renewable resources, except ....
   a. plants   b. animals
   c. coal   d. water
3. Humans can .... wastewater to recycle it and use it again.
   a. filter   b. boil
   c. freeze   d. conserve

(B) Give a reason for:

- We can't drink water of estuaries.

....

....

Q2. (A) Put (✓) or (✗):

- Tributaries are small bodies of water that flow into a bigger river. (   )

(B) Write the scientific term:

1. They are scientists who work in water treatment plants. (................................)
2. They are bodies of water that surround the continents. (................................)

Q3. (A) Cross out the odd word:

- Marshes – Ponds – Rivers – Seas (................................)

(B) Complete the following sentences:

1. The area of land where all the water flows in one direction to a common location, such as an ocean, is called ....
2. When the rainfall increases on a river, the level of water in this river will ...., causing ....

Model Exam 4

Q1. (A) Put (✓) or (✗):

1. Bays and seas are examples of large bodies of water. ( )
2. Rains are among the sources of fresh water. ( )
3. A stream may dry up due to increasing the level of water in it. ( )

(B) Give a reason for:

- Wastewater engineers test the treated water before releasing it into rivers and lakes.

....

....

Q2. (A) Choose the correct answer:

- Preventing the development of Ras Mohammed Protectorate is considered an example of ....

a. preservation
b. pollution
c. sustainability
d. consumption

(B) Complete the following sentences:

1. The wells may dry up when .... runs out.
2. In Aswan High Dam, water is used to ....

Q3. (A) Cross out the odd word:

- Gulfs – Seas – Oceans – Rain water (....................)

(B) What happens if:

1. A trash dump is found near a tributary that is connected to a river?

....

2. You mix clear water with a small amount of mud?

....

Model Exam 5

Q1. (A) Choose the correct answer:

1. All of these can be removed by a simple water filter, except ....
   a. mud b. rock pieces
   c. salt d. dirt
2. .... include both swamps and ponds.
   a. Seas b. Rivers
   c. Sand dunes d. Wetlands
3. Deforestation causes water and wind to carry away soil, causing ....
   a. water pollution b. soil deposition
   c. water cycle d. soil erosion

(B) Give a reason for:

- Scientists tend to create methods to filter polluted water.

....

Q2. (A) Put (✓) or (✗):

- All oceans on Earth are connected together. (   )

(B) Write the scientific term:

1. They are small creeks or steams that flow into bigger rivers. (............)
2. It is a freshwater body that starts at a mountain in the form of a stream and ends at a sea. (............)

Q3. (A) Correct the underlined word:

- Water is considered a nonrenewable natural resource. (............)

(B) Classify the following into sustainable situation or unsustainable situation:

1. Placing some cows in one large area of grass: ....
2. Burning huge amounts of fossil fuels: ....

Concept 4.1 Effects of Gravity

1 Summary of Concept 1

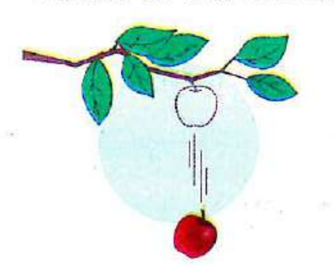
Gravity

1. Gravity is the force of pulling (attraction) between objects that have mass.
2. It is an invisible force that acts on all objects on or near Earth.
3. If there is no gravity, we will float like astronauts into space.
4. Gravity changes the direction of moving objects.

Examples of Gravity Forces

1. The Earth's Gravity

It pulls objects with mass down toward the center of the Earth.



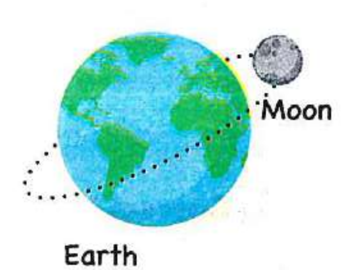
2. The Sun's Gravity

It keeps the planets in fixed orbits around the Sun.



3. The Moon's Gravity

It affects the ocean tides.



Factors Affecting Gravity between Two Objects

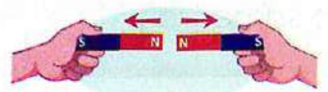
1. **The mass of the two objects**
(Gravity increases as the mass of the objects increases, and vice versa.)
2. **The distance between the two objects**
(Gravity increases as the distance between the two objects decreases, and vice versa.)

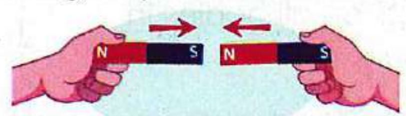
Force: It is a pull or push applied to an object to make it move.

Types of Forces

1 Magnetism

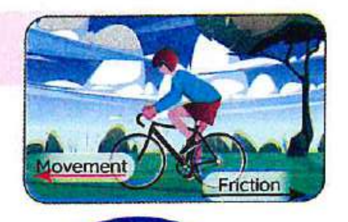
- It is the force of attraction or repulsion between two magnets or between a magnet and some objects.
- Magnets have an invisible force that cannot be seen, known as magnetism.

The attraction force of the magnet (Pulling Force)	The repulsion force of the magnet (Pushing Force)
1 A magnet pulls another magnet.  2 A magnet attracts some metal objects made of iron, cobalt, and nickel. 	A magnet pushes (repels) another magnet. 

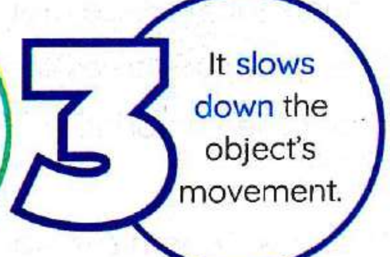


2 Friction

- It is a force that opposes the motion of a body across a solid surface or through a gas or liquid.



1. It arises between two objects touching each other.
2. It acts in the opposite direction of the object's motion.
3. It slows down the object's movement.



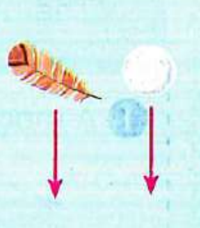
3 Air Resistance



- It is a type of friction force.
- It is a force that opposes the movement of an object as it passes through the air.
- When a skydiver opens his parachute during landing, air resistance acts against gravity, decreasing the speed of his landing on Earth.

If there is no air resistance:

- All bodies will reach the ground at the same time because the force of gravity is constant and acts on all bodies in the same way.

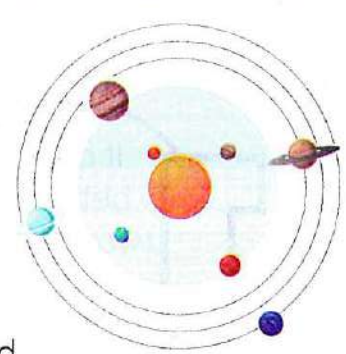


4 Wind Force

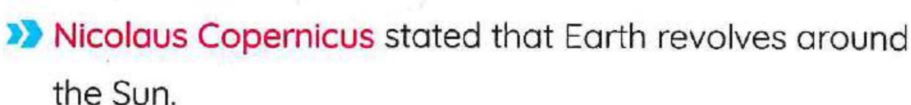
- Wind pushes the blades of a wind turbine, causing their movement.



Solar System



- Our solar system consists of the Sun and eight planets that revolve around it.
- Each planet revolves around the Sun in a fixed path called an orbit, which has an elliptical (oval) shape.



- Nicolaus Copernicus stated that Earth revolves around the Sun.
- Earth revolves around the Sun at a speed that nearly equals 107,000 km per hour.

2 Definitions of Concept 1

Gravity	• It is the force that pulls objects with mass toward the center of the Earth. • It is the force of attraction that exists between objects that have mass.
Force	It's a pull or a push that is applied to an object.
Motion	It is a change in the position of an object compared to another object.
Magnetism	It's the force of attraction or repulsion between two magnets or between a magnet and some objects.
Moon	It is a celestial body that orbits the Earth in a fixed orbit.
Friction	It's a force that opposes the motion of a body across a solid surface or through a gas or liquid.
Air resistance	It's a type of friction force that opposes the movement of an object as it passes through the air.
Law of Motion	The force of gravity is constant and acts on all objects in the same way.

3 Give Reasons For... Concept 1

1. The moon is attracted to the Earth.
   - Due to the gravitational force of the Earth.
2. Astronauts seem to float into space.
   - Because there is no gravity in space.
3. Paperclips are pulled toward a magnet.
   - Due to the pulling force of the magnet.
4. Air resistance affects the movement of an object that falls from a height.
   - Because air resistance pulls objects backward against the force of gravity, slowing down the movements of objects.
5. The force of gravity has an important role in the solar system.
   - Because the Sun's gravity keeps the planets revolving in fixed orbits around the Sun.
6. The gravity between two objects depends on the distance between them.
   - As the distance between two objects increases, the gravity between them decreases, and vice versa.
7. Earth's gravity is greater than the moon's gravity.
   - Because Earth has a greater mass than the moon.
8. The bike stops after a while when you stop pedaling.
   - Due to the friction between the tires and the ground, the bike slows down until it stops.
9. The skydiver opens his parachute during landing.
   - To increase air resistance to the parachute and slow down his drop.
10. The Sun is considered the center of the solar system.
    - Because the Sun has the greatest gravity in the solar system.
11. You always land on the ground when you jump up.
    - Because the gravity pulls you toward the Earth's center.
12. Planets revolve around the Sun in fixed orbits.
    - Due to the gravity around the Sun.

4 What Happens...? Concept 1

1 If the distance between the Earth and the moon increases to twice?

- The gravity between the Earth and the moon decreases, and the moon might float into space.

2 If the mass of the moon becomes twice its real mass?

- The gravity between the moon and the Earth increases, so the moon might crash into the Earth.

3 To the moon if there's no gravity between the moon and the Earth?

- The moon might float off into space.

4 If the mass of the moon decreases to half?

- The gravity between the Earth and the moon decreases, and the moon might float into space.

5 To the ball when it is thrown up into the air?

- Gravity pulls it down, changing its direction.

6 To the planets if the Sun has no gravity?

- The planets float off into space and leave their orbits around the Sun.

7 If a magnet is placed near some paperclips?

- The magnet attracts the paperclips.

8 If a skydiver opens his parachute during landing?

- Air resistance increases, so the speed of his drop decreases.

9 If a metal ball and a feather fall down from a tower?

- The metal ball reaches the ground first.

5 Exams on Concept 4.1

Model Exam 1

Q1. (A) Choose the correct answer:

1. The gravity force depends on the .... of the object.
   a. mass b. temperature c. shape d. color
2. In the solar system, planets stay in their orbits due to the gravity of ....
   a. the moon b. the Sun c. Mars d. Earth
3. Magnetism is a force that attracts objects made of the following materials, except the ....
   a. nickel b. cobalt c. iron d. wood

(B) What happens to:

- The moon if there's no gravity between the moon and Earth?

....

Q2. (A) Put (✓) or (✗):

- Air resistance opposes the movement of objects through air. (   )

(B) Write the scientific term:

1. It is the force of attraction that exits between objects that have mass. (....................)
2. It is the law which states that the force of gravity is constant and acts on all objects in the same way. (....................)

Q3. (A) Cross out the odd word:

- Magnetism – Gravity – Friction – Earth (....................)

(B) Imagine that jar (A) contains air, while jar (B) doesn't contain air. Then, answer the following:

1. Complete: In jar (A), the feather is affected by .... air resistance than the stone.
2. Why are the feather and the stone moving with same speed in jar (B)?

....

Jar A Jar B

Model Exam 2

Q1. (A) Choose the correct answer:

1. The moon has greater gravity than that of ....
   a. Earth only b. the Sun c. a magnet d. Earth and the Sun
2. A person can exert a weak force to move .... (Giza 2023)
   a. a big truck b. a real car
   c. a very big rock d. a toy car
3. The Earth attracts objects towards ....
   a. its center b. the sky c. the moon d. the Sun

(B) What happens if:

- A skydiver opens his parachute during landing?

....

Q2. (A) Put (✓) or (✗):

- Gravity only affects objects in motion. ( )

(B) Complete the following sentences:

1. .... is a pull or push that is applied to an object.
2. Earth revolves around the Sun in the shape of an .... orbit.

Q3. (A) Correct the underlined word:

- Friction force acts in the <u>same</u> direction of the object's motion. (................)

(B) Observe the following figures, then mention if the acting force is attraction or repulsion:

1. S N N S

....

2.

....

Model Exam 3

Q1. (A) Choose the correct answer:

1. .... is a factor that acts against the force of gravity.
   a. Magnetism
   b. The mass of an object
   c. Air resistance
   d. The shape of an object

2. The orbit that each planet revolves in around the Sun has .... shape.
   a. a circular
   b. an oval
   c. a zigzag
   d. a rectangular

3. The solar system consists of ....
   a. the Sun and moon only
   b. the Sun and a group of planets
   c. the Sun and Earth only
   d. a group of planets only

(B) What happens to:

- Planets of the solar system if the Sun has no gravity?

....

Q2. (A) Put (✓) or (✗):

- A magnet can push the objects which are made of some metals, such as iron. (   )

(B) Complete the following sentences:

1. When a skydiver opens his parachute, his landing velocity ....
2. .... lies in the center of the solar system.

Q3. (A) Correct the underlined word:

- <u>Gravity</u> is the force that slows down moving objects and opposes their motion. (....................)

(B) Mention the two factors that affect the force of gravity between two objects.

1. ....
2. ....

Model Exam 4

Q1. (A) Choose the correct answer:

1 Magnetism is a kind of force that involves ....

a. repulsion only
b. attraction only
c. repulsion and attraction
d. visible and invisible forces

2 The gravitational force of an object .... as its mass increases.

a. increases
b. decreases
c. equals zero
d. doesn't change

3 The skydiver in the sky is affected by ....

a. gravity only
b. air resistance only
c. magnetism
d. gravity and air resistance

(B) What happens if:

The distance between the moon and Earth increases to its twice?

....

Q2. (A) Cross out the odd word:

Cobalt – Wood – Nickel – Iron (..........................)

(B) Complete the following sentences:

1 An astronaut floats in space due to the absence of ....

2 The attraction force between the Earth and the Sun is .... than that between the Earth and the moon.

Q3. (A) Put (✓) or (✗):

The Earth's gravity changes the direction and mass of moving objects. (   )

(B) Which one of the following objects will reach the ground first on dropping them from a tower? And why?

....

....

....

....

Object 1

Object 2

Model Exam 5

Q1. (A) Choose the correct answer:

1. The materials that are attracted to the magnet include ....
   a. iron and nickel b. aluminum and copper
   c. copper and silver d. silver and gold
2. The direction of Earth's gravity is always toward the ....
   a. the center of the moon b. the poles of the Earth
   c. the sky of the Earth d. the center of the Earth
3. A table standing on the ground needs .... to move.
   a. sunlight b. mass c. a force d. air

(B) Give a reason for:

The speed of your bike decreases when you stop pedaling.

....

Q2. (A) Correct the underlined word:

Objects move down toward the ground due to the effect of magnetism. (..........

(B) Write the scientific term:

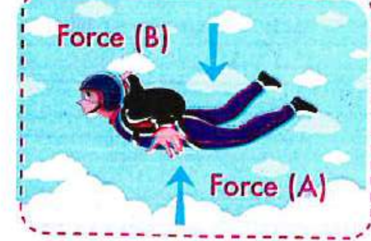
1. He is a scientist that proved that the Sun is the center of our solar system. (..........
2. It is the force that opposes the movement of an object across a solid surface, liquids, or gases. (..........

Q3. (A) Put (✓) or (✗):

Earth revolves around the moon at a speed that nearly equals 107,000 km per hour. (

(B) Look at the following figure, then complete:

1. Force (A) is called ....
2. Force (B) is called ....



Concept 4.2 Patterns of Motion in the Sky

1 Summary of Concept 2

Rotation: It is the spinning of an object on its axis.

Revolution: It is the orbiting of an object around another object.

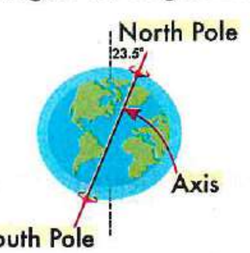
Cycle: It is a series of events that are repeated in the same order.

Earth's axis: It is an imaginary line passing through the North Pole and South Pole of Earth.

Earth has two motions:

1 Earth rotates around its axis. (Takes one day)

- Earth rotates counterclockwise on its vertical axis at a very high speed.
- Earth is slightly tilted on its axis, where the angle of tilt changes throughout the year.

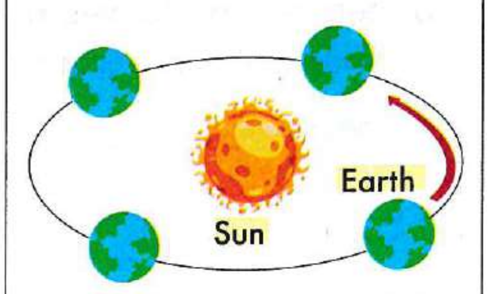


Earth's rotation on its axis makes:

1. The cycle of day and night occur.
2. The Sun, planets, and stars appear to move across the sky.
3. Shadows of objects move throughout the day.

2 Earth revolves around the Sun in an orbit. (Takes one year)

- Earth's path around the Sun is elliptical (oval).



Earth's revolution around the Sun causes:

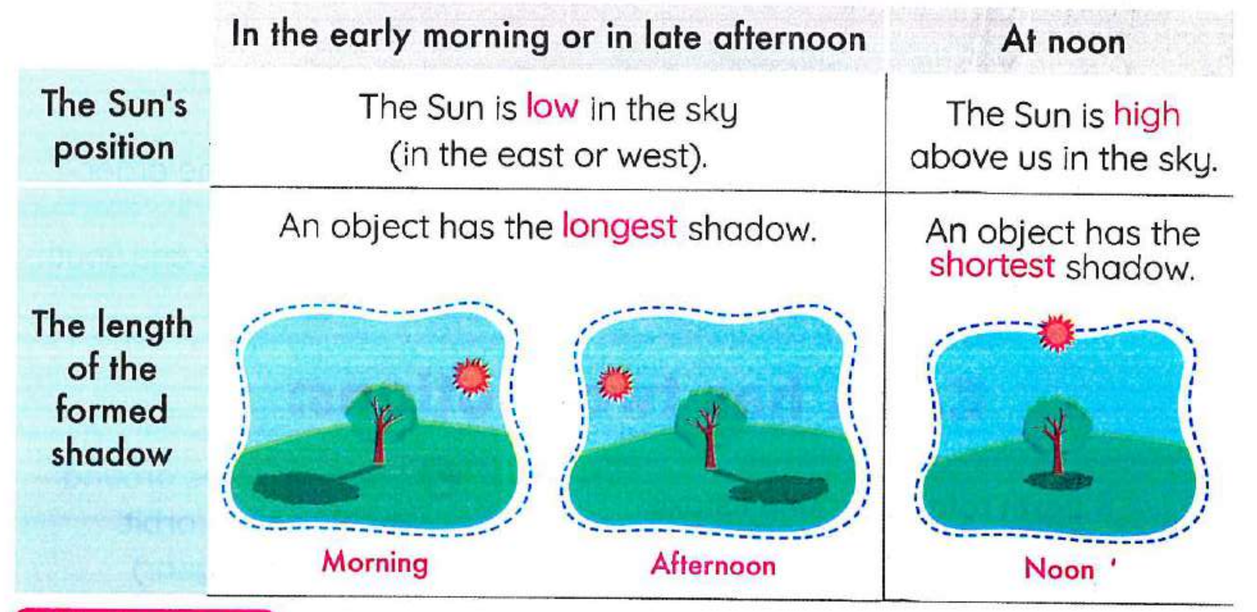
- The cycle of four seasons.

NOTE:

- We can't feel the Earth's spinning on its axis, as we move at the same speed as the Earth's rotation on its axis.

Shadow:

- You can observe shadows of objects moving throughout the day.
- **The factors that affect the length and angle of a shadow:**
  - The position of the Sun.
  - The amount of sunlight that reaches the Earth during different seasons.

	In the early morning or in late afternoon	At noon
The Sun's position	The Sun is low in the sky (in the east or west).	The Sun is high above us in the sky.
The length of the formed shadow	An object has the longest shadow.  Morning / Afternoon	An object has the shortest shadow. Noon

Universe

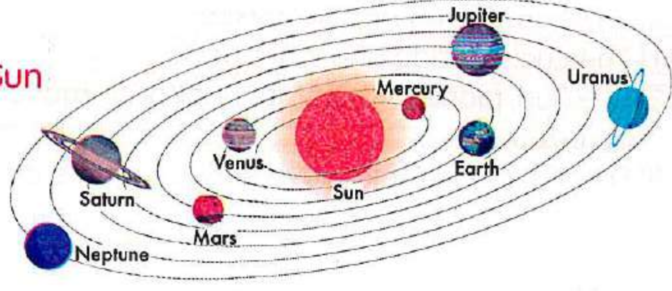
- It is the wide space that contains celestial objects, such as galaxies, stars, planets, moons, comets, meteors, and even human-made satellites, like International Space Station..., etc.

Galaxy

- It is a group of stars, planets, and gases that are held together by gravity.

Solar System

- The solar system includes the **Sun** and **eight planets** that revolve around the Sun in fixed orbits.
- Planets rotate on their axes in different speeds.



- Jupiter is the **fastest-rotating planet** around its axis in the solar system.

Stars

1. Stars are giant spheres of superhot gases made of mostly **hydrogen** and **helium** gases.

2. Stars appear to move across the night sky due to the rotation of the Earth on its axis.

3. Some stars are larger than our Sun, while others are smaller.

The Sun

1. - The Sun is a **medium-sized star**.
   - The Sun is the only star in our solar system.

2. The Sun is the **center** of the solar system.

3. The Sun provides the Earth with **heat** and **light** energies.

Sunshine

» The cities in the east, such as Marsa Alam, see the sunrise before the cities in the west, such as Siwa.

Moon

- The moon is a dark celestial body that seems to be bright as it reflects the sunlight that falls on it.
- The moon phases change as the moon revolves around the Earth.
- The moon makes a complete cycle around the Earth each lunar month.

Guidelines to Help Students

If the question says:	The moon's phase will be:
The moon appears fully illuminated. (It appears as a completely bright circle.)	Full Moon
The moon appears completely dark.	New Moon
One half is illuminated + the other half is darkened.	Quarter
The edge of the moon's face appears illuminated. (The bright part is less than the dark one.)	Crescent
The bright part is greater than the dark one.	Gibbous

The moon phases during the lunar month "Hijri month":

Moon Phase	Description
① First Crescent	• The edge of the moon's face is illuminated (bright) where its size increases gradually with time. • This phase is the first phase of the moon phases.
② First Quarter	• One half of the moon's face is illuminated. • The other half of the moon's face is darkened.
③ First Gibbous	• The bright illuminated end part of the moon's face increases gradually. • The line separating the illuminated part and the darkened part appears curved.
④ Full Moon	• The apparent face of the moon that faces the Earth is fully illuminated. • This phase appears in the middle of the lunar month. (Where Earth lies between the Sun and the moon)
⑤ Second Gibbous	• The illuminated part of the moon's face decreases gradually. • The line separating the darkened part and the illuminated part appears curved.
⑥ Second Quarter	• One half of the moon's face is darkened. • The other half of the moon's face is illuminated.
⑦ Second Crescent	• The edge of the moon's face is an illuminated crescent.
⑧ New Moon	• The apparent face of the moon that faces the Earth is fully darkened. • This phase appears on the last day of the lunar month. (Where the moon lies between the Sun and Earth)

Constellations

Constellation

- It is a group of stars that looks like it forms a pattern of a certain shape in the sky.

Example: The Constellation Orion

- The ancient Greeks gave it this name relative to a mythical hunter.



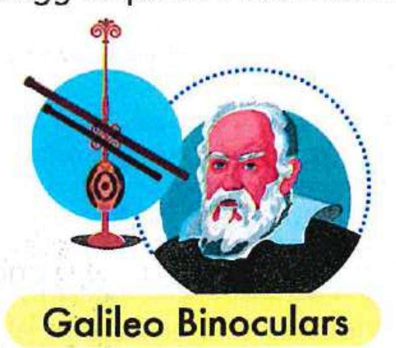
Scenario	Result
• The positions of stars don't change, but they seem to move across the night sky.	• Earth's rotation on its axis
• Constellations appear at different locations in the sky during different times of the year. • So, we can see different constellations in winter than in summer.	• Earth's revolution around the Sun
• Every night, new stars appear in the sky from the east.	• Earth's revolution around the Sun
• Some constellation become invisible to us although they still exist in their location.	• Earth's revolution around the Sun

NOTE:

- The location of constellations near the North and South Poles changes a little bit throughout the year, as the stars close to these poles move slightly in the sky.

Using Technology to Study the Universe

» Technology helps us invent some tools, such as:



Galileo Binoculars



Hubble Telescope

Importance of Binoculars and Telescopes

They help us take a closer look at more distant objects in more details, such as:

1. The surface of the moon
2. Asteroids
3. Our neighboring planets
4. Stars in and out of our galaxy

Planetarium

» It is a place where we can see images of stars, planets, constellations, and other celestial bodies on its dome ceiling.

How the Planetarium Works

1. A projector that displays images on its ceiling that looks like a dome.
2. Special computer programs are used to show pictures of:
   - What the sky looks like during certain times of the month or year.
   - What the sky looked like many years ago.



Copernicus

- He proved that the Sun is the center of the solar system.

2 Definitions of Concept 2

Earth's axis	It's an imaginary line that passes through the two poles of Earth.
Earth's rotation	It is the spinning of the Earth on its axis once every 24 hours.
Earth's revolution	It is the orbiting of the Earth around the Sun.
Cycle	It is a series of events that are repeated in the same order.
Solar system	It's a system that includes the Sun and eight planets that revolve around the Sun in fixed orbits.
Jupiter	It is the fastest-rotating planet on its axis in the solar system.
Constellation	It is a group of stars that forms a pattern in the sky.
Full Moon phase	It's a moon phase that appears in the middle of the lunar month, in which the moon appears as a completely bright circle.
Crescent phase	It is the first phase of the moon phases, where only the edge of the moon face is illuminated.
New Moon phase	It's a moon phase that appears on the last day of the lunar month, in which the moon is completely dark.
Planets	They're dark celestial bodies that revolve around the Sun in fixed orbits.
The Sun	• It's a medium-sized star. • It is the only star in the solar system. • It is the center of the solar system.
Stars	They are giant spheres of superhot gases; most of them are hydrogen and helium.
Galaxy	It's a group of stars and other celestial objects held together by gravity.
Universe	It's a wide space that contains celestial objects, such as stars, galaxies, comets, meteors, and human-made satellites.
Atmosphere	It is a protective layer around Earth that allows some light waves to pass through while blocking some other light waves.
Planetarium	It is a place where we can see images of stars, planets, constellations, and other celestial bodies.

3 Give Reasons For... Concept 2

1. The day and night phenomenon occurs.
   - Due to the rotation of the Earth on its axis.
2. The Sun appears to move across the sky throughout the day.
   - Due to the rotation of the Earth around its axis.
3. The four seasons cycle occurs.
   - Due to the Earth's revolution around the Sun.
4. Sunrise and sunset times are different each day on Earth.
   - Due to the Earth's elliptical orbits and the tilt of the Earth on its axis.
5. The position of the Sun changes in the sky throughout the day.
   - Due to the Earth's rotation around its axis.
6. The length of the shadow of an object changes throughout the day.
   - Because the position of the Sun changes in the sky throughout the day as the Earth rotates on its axis.
7. Although Earth rotates on its axis, we don't feel its movement.
   - Because we are moving at the same speed as Earth's rotation on its axis.
8. The moon has different phases during the lunar month.
   - Due to the revolution of the moon around the Earth, and the revolution of both of them around the Sun.
9. Every night, new stars appear in the sky from the east.
   - Due to the revolution of the Earth around the Sun.
10. The moon is a dark body, but we see it shiny at night.
    - Because the moon reflects the sunlight falling on it.
11. Stars seem bright in the night sky.
    - Because they are made of hot gases.

12 The Sun looks much larger to us than other stars.

- Because the Sun is nearer to us than other stars.

13 Some telescopes on the Earth's surface cannot observe very distant celestia bodies.

- Due to the presence of the atmosphere that allows some light waves only tc pass to Earth and block other light waves.

14 Astronauts cannot be sent to study stars or other celestial bodies.

- Because the universe is so big, and these celestial bodies are just too far away.

4 What Happens If...? Concept 2

1 The Earth rotates on its axis?

- The cycle of day and night occurs.

2 The Earth stops spinning on its axis?

- The cycle of day and night does not occur.

3 Hydrogen and helium gases are burned inside the Sun?

- They produce heat and light.

4 Half of the Earth faces the Sun?

- This half of Earth has day.

5 The Earth rotates in a clockwise direction on its axis?

- The Sun and other stars seem to move from west to east.

6 The Earth revolves around the Sun?

- The cycle of four seasons occurs.

7 The sunlight falls on the moon's surface?

- The moon reflects the sunlight on Earth, so it appears bright.

8 The sunlight falls on a tree in the morning and at noon?

- The tree has the longest shadow in the morning, but it has the shortest shadow at noon.

5 Exams on Concept 4.2

Model Exam 1

Q1. (A) Choose the correct answer:

1. .... is the fastest-rotating planet on its axis in the solar system.
   a. Jupiter b. Earth c. Mars d. The moon
2. The Earth rotates on its axis once every ....
   a. 24 days b. 24 hours c. 365 days d. 365 hours
3. Stars and the Sun are made of hot gases; most of them are .... and ....
   a. hydrogen – oxygen b. hydrogen – nitrogen
   c. nitrogen – helium d. helium – hydrogen

(B) Give a reason for:

- The day and night phenomenon occurs.

....

Q2. (A) Put (✓) or (✗):

- The solar system is a group of stars, planets, and gases held together by gravity. (   )

(B) Write the scientific term:

1. It is a wide space that contains celestial objects, such as galaxies, stars, and planets. (....................)
2. It is a special building with a dome ceiling and is used to see images of celestial bodies. (....................)

Q3. (A) Cross out the odd word:

- Crescent – Gibbous – Earth – New Moon (....................)

(B) From the opposite figure, complete:

1. This figure represents constellation ....
2. This constellation consists of a group of ....

Model Exam 2

Q1. (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 The Sun	a. is the first timepiece that was used by ancient Egyptians to know the time.
2 The sundial	b. is a dark celestial body that gives off its own light
3 The moon	c. is a medium-sized star that gives off its own light.
	d. is a dark celestial body that revolves around Earth.

1 .... 2 .... 3 ....

(B) What happens if:

- The Earth stops spinning on its axis?

....

Q2. (A) Choose the correct answer:

- The Sun appears as it moves from .... to ....
  - a. south – north
  - b. west – east
  - c. east – west
  - d. north – south

(B) Write the scientific term:

1. It is a group of stars that forms a pattern in the sky. (....................)
2. It is an imaginary line passing through the two poles of Earth. (....................)

Q3. (A) Put (✓) or (✗):

- Constellations help us determine the main directions. (   )

(B) Write the moon phase of each of the following pictures of the moon:







A .... B ....

Model Exam 3

Q1. (A) Choose the correct answer:

1. The shortest shadow of an object appears ....
   a. in the morning
   b. in the afternoon
   c. at noon
   d. at night
2. The number of stars in the solar system is ....
   a. one
   b. eight
   c. nine
   d. two
3. Half of the moon face can be seen illuminated in the .... phase.
   a. New Moon
   b. Quarter
   c. Gibbous
   d. Full Moon

(B) Give a reason for:

- The stars seem bright in the night sky.

....

Q2. (A) Correct the underlined word:

- Copernicus proved that the <u>Earth</u> is the center of the solar system. (................................)

(B) What happens:

1. If half of the Earth faces the Sun?

....

2. To a tree's shadow in the morning and at noon?

....

Q3. (A) Put (✓) or (✗):

- The sunrise and the sunset occur at the same time every day. (   )

(B) Classify the following to revolution or rotation:

1. It is the spinning of an object around an axis: ....
2. It is the movement of an object around another object: ....

Model Exam 4

Q1. (A) Choose the correct answer:

1. Every night, new stars appear from the ....
   a. north b. south c. east d. west
2. .... has the greatest gravitational force in the solar system
   a. Jupiter b. The moon c. Earth d. The Sun
3. The moon appears as a completely bright circle at the .... phase.
   a. New Moon b. Full Moon c. Crescent d. Quarter

(B) Give a reason for:

- The Sun appears to move across the sky from the east to the west.

....

Q2. (A) Cross out the odd word:

- Earth – Stars – The moon – Jupiter (................)

(B) Write the scientific term:

1. It is the time taken by the moon to make one revolution around Earth. (................)
2. It is a phenomenon that occurs when half of the Earth doesn't receive any sunlight. (................)

Q3. (A) Put (✓) or (✗):

- The Earth orbits the Sun in an elliptical path. (   )

(B) Compare between the moon's cycle and the seasons' cycle according to the cause of their occurrence:

Moon's Phases Cycle	Four Seasons Cycle
....	....
....	....
....	....

Model Exam 5

Q1. (A) Choose the correct answer:

1. The moon appears completely dark in the .... phase, which occurs in the .... of the lunar month.
   a. Full Moon – beginning
   b. Crescent – end
   c. New Moon – beginning
   d. New Moon – end

2. Day and night phenomenon occurs due to the rotation of the Earth around ....
   a. the Sun
   b. the moon
   c. the solar system
   d. its axis

3. The Sun and other stars are made up of ....
   a. hot solids
   b. hot gases
   c. cold solids
   d. cold liquids

(B) Give a reason for:

- The Sun looks much larger to us than other stars.

....

Q2. (A) Correct the underlined word:

- <u>Gibbous</u> is the moon phase at which one edge only appears bright. (....................)

(B) Complete the following sentences:

1. The wide space that contains celestial object is called ....
2. Some telescopes on the Earth's surface can't observe distant celestial bodies due to the presence of the ....

Q3. (A) Put (✓) or (✗):

- we can see different constellations in winter than in summer due to the Earth's revolution. (   )

(B) Mention two technological tools that help us see distant celestial bodies in space in more details:

1. ....
2. ....

Projects



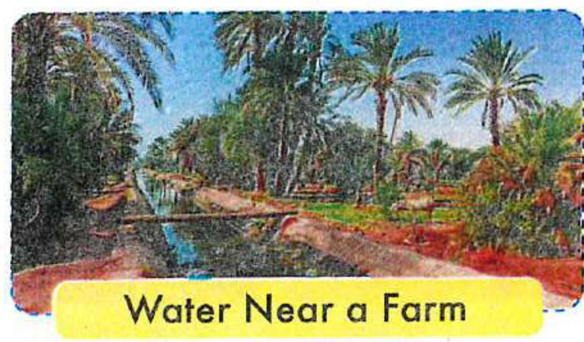
Project 1 Unit 3

We All Live Downstream

Wherever you live, there is water nearby. This water could be a small stream, a pond, a large river, or even an ocean.



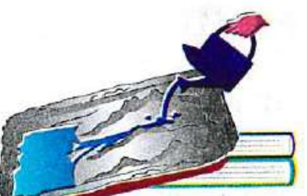
Water in the City

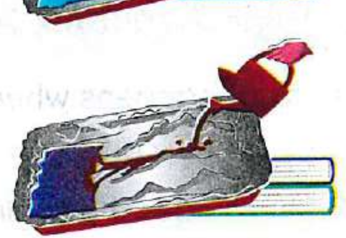


Water Near a Farm

- We will create a model of a watershed and simulate the introduction of pollutants.
- You will observe how pollutants travel and affect many different water resources.

Steps:





1. Use clay to create some landforms (mountains with different heights on a baking pan).
2. Cover the inner surface of the baking pan with aluminum foil.
3. Use books to lift up the baking pan from your side.
4. Pour some clear water from your side and observe how the water flows until it reaches the watershed.
5. Pour some colored water (representing pollutants) from another stream.

1. استخدم قِطَع الصلصال لتصميم تضاريس (جبال مختلفة الارتفاع).
2. قم بتغطية صينية الخبز من الداخل بورق الألومنيوم.
3. استخدم مجموعة من الكتب؛ لجعل الصينية مائلة.
4. قم بصب القليل من المياه النظيفة، ولاحظ تحركها لأسفل حتى تصل للمستجمع المائي.
5. قم بصب الماء الملون (يمثل الملوثات) من جهتك، ولكن فى مجرى مياه آخر.

Observation:

- The red-colored water flows down until it reaches the watershed and mixes with the clear water.

- ستلاحظ أن الماء الملون قد تحرَّك إلى المستجمع المائي، ثم اختلَطَ مع المياه الموجودة.

The Model

» Now, create your model. Be sure to label the supplies you will use.

What will you do?

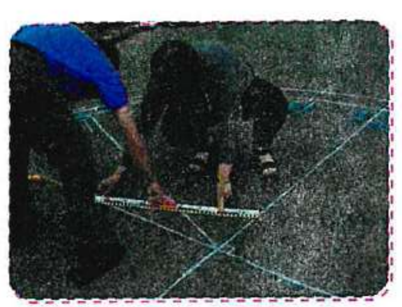
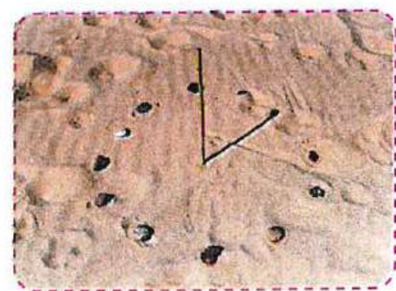
Trial	Water Quality	Where Will the Water Move to?	What Did the Water Do?	Potential Effects of the Water
Trial 1				
Trial 2				

Think About the Activity

1. What happens when pollution enters a watershed?
   - Pollution can spread quickly from one body of water to other water resources.
2. What does the saying "We all live downstream" mean?
   - "We all live downstream" means if someone upstream pollutes a river, the pollution affects all the living organisms and resources downstream.
3. Why is it important to monitor the quality of different water resources?
   - Because pollutants could enter the water at any time.
   - Monitoring the quality will make people aware of what is going on and let scientists know when they need to act and make changes.
4. How is a model a valuable tool for studying watersheds?
   - Because it helps us see watersheds on a usable scale. We can fit the model on a table, while a real watershed is too large to see without special tools, such as flying in a plane or using special maps.

Project 2 Unit 4

Sundial

Importance	Sundials have been used to tell time for thousands of years. استخدم الإنسان الساعات الشمسية لمعرفة الوقت منذ آلاف السنين.
Structure	A sundial is usually a flat disk with a rod at the center, called a gnomon. الساعة الشمسية عبارة عن قرص مسطح مع عصا فى المنتصف تُسمى عقربًا.
How It Works 	• Earth's rotation causes the shadow from the gnomon to move across the disk throughout the day. • The sundial must always stay in the same place. If it is turned, the shadow will tell the wrong time. • يتسبب دوران الأرض حول محورها فى تحرك ظل العقرب على القرص طوال اليوم. • يجب أن تبقى الساعة دائمًا فى نفس المكان؛ لأن تغيُّر مكانها سيخبرك بالوقت الخطأ.
Types	• Some sundials are about a half meter wide and about the right size for a garden. • Some sundials are many meters wide, and they are found in public parks. • Some sundials have no gnomon; they're called human sundials. A person must act as a gnomon. The person stands in the center where the gnomon would ordinarily be and observes where the shadow falls. • بعض الساعات الشمسية يكون عرضها نصف متر، ويكون حجمها مناسبًا لوضعها فى الحديقة. • بعض الساعات الشمسية الأخرى يبلغ عرضها عدة أمتار، وتوجد فى الحدائق العامة. • بعض الساعات الشمسية ليس لها عقرب، وتُسمى بالساعة الشمسية البشرية؛ حيث يقف الشخص فى مركز القرص، ويلاحظ مكان سقوط الظل.

Steps:

1. Choose a location for your human sundial in your schoolyard.
2. Both your sundial and the human gnomon should be oriented to the north.
3. Your teacher will assist you in determining which direction is north using a compass.
4. Design your sundial. Label all the parts of your design.
5. Gather the materials you will use to build your model.

1 اختر موقعًا للساعة الشمسية فى فناء مدرستك.

2 يتم توجيه الساعة الشمسية والشخص الذي يقف فى منصف القرص (يمثل العقرب) فى اتجاه الشمال.

3 سيساعدك المعلم فى معرفة اتجاه الشمال عن طريق استخدام البوصلة.

4 صمِّم ساعتك الشمسية وقم بتحديد وضع العلامات. 5 أحضر المواد التي ستساعدك فى تصميم النموذج.

Safety Note

Remember to never look directly at the Sun. Doing so can permanently damage your eyes.

Think About the Activity

1. How did you decide how large your sundial would be?
   - We looked at the lengths of our shadows at different times of the day and drew the circle small enough for the shadow to hit the hour markers.
2. What materials did you choose to mark the hours, and why did you choose them?
   - We decided to use large rocks with painted numbers for the hour markers because they would be hard to move and the numbers would not wear out easily.
3. How did you test the accuracy of your sundial?
   - After we placed the markers, we checked to see where our shadow fell at several different times during the day and adjusted the markers as needed to match the shadow.

» Draw your sundial design:

» Write or draw your answers to the questions in the chart:

What worked?	What didn't work?	What could work better?

Interdisciplinary Project

Water by the Sea

- About 70% of the Earth is covered by water.
- 96.5% of this water is salt water.
- 3.5% of this water is fresh water.
- People can't drink ocean water because it is salty.
- Scientists designed a process known as "desalination" to remove salt and minerals from sea or ocean water to get drinkable water.

- 70 % من كوكب الأرض مُغطى بالماء. • 96.5 % من هذا الماء يعتبر ماء مالحًا. • 3.5 % من الماء يعتبر ماء عذبًا.
- لا يستطيع الناس شرب مياه المحيط رغم توافرها؛ لأنها مياه مالحة.
- صمّم العلماء عملية (تحلية مياه البحر) لإزالة الأملاح من مياه البحار أو المحيطات؛ وبالتالي الحصول على مياه صالحة للشرب.

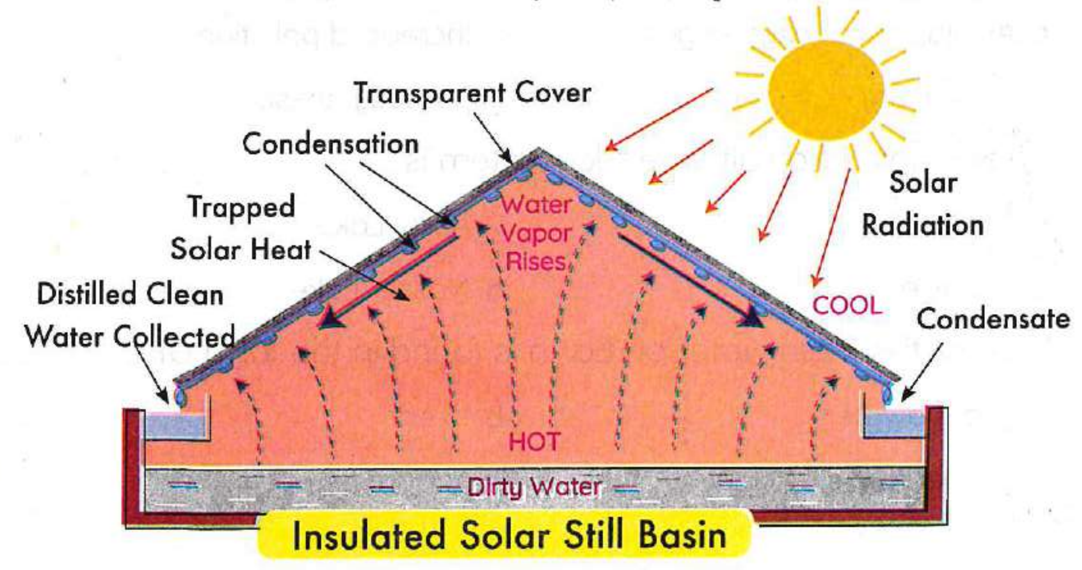
Desalination

Desalination includes two processes, which are:

1 Evaporation	2 Condensation
Salt water is heated and evaporates, producing water vapor.	The water vapor produced is condensed and collected to produce fresh water.

Scientists have created a device known as a "solar still," which is used in the desalination process. It uses solar energy to heat salty water

- قام العلماء بتصميم جهاز يُسمى (المقطر الشمسي)؛ حيث يتم استخدم الطاقة الشمسية لتسخين المياه المالحة.



Assess Your Learning (School Book)

1 School Book Questions on Unit 3

Choose the correct answer:

1. The fresh water that flows under the Earth's surface through a layer o porous rock is ....
   - a. Mediterranean Sea water
   - b. Bahr Al Baqar Water Plant
   - c. Assal Lake
   - d. groundwater

2. .... are parts of the geosphere.
   - a. Plants
   - b. Gases
   - c. Rocks
   - d. Bodies of water

3. An area of land where water flows in a specific path from a high-altitude area to a lower-altitude area is a/an ....
   - a. river
   - b. sea
   - c. lake
   - d. ocean

4. .... results from the interaction between the hydrosphere and the atmosphere.
   - a. Availability of oxygen gas
   - b. Increased pollution
   - c. Soil fertility
   - d. Photosynthesis

5. An example of a saltwater ecosystem is ....
   - a. the Nile River
   - b. Assal Lake
   - c. a glacier
   - d. Nasser Lake

6. Most of the fresh water on Earth is found in the form of ....
   - a. groundwater
   - b. rivers
   - c. glacier rivers
   - d. streams

7 A group of plants and animals which live together in a large area characterized by its climate is called the ....

a. atmosphere b. hydrosphere c. biome d. geosphere

8 Weathering of rocks by water indicates an interaction between ....

a. the hydrosphere and the geosphere

b. the biosphere and the hydrosphere

c. the biosphere and the atmosphere

d. the atmosphere and the hydrosphere

9 The water that covers most of the Earth's surface is the ....

a. fresh water in rivers

b. salt water in seas and oceans

c. fresh water in glaciers

d. fresh water in groundwater

10 The protectorate is one example of ....

a. sustainability of natural resources b. depletion of natural resources

c. the quality of natural resources d. preservation of natural resources

11 Sea and ocean water meet with river water at ....

a. watersheds b. surface canals

c. estuaries d. streams

12 .... of resources requires managing their usage methods.

a. Depletion b. Renewability

c. Sustainability d. Scarcity

13 Pollution of sea water leads to ....

a. pollution of water of a tributary b. pollution of oceans water

c. pollution of water streams d. wetlands pollution

14 Wastewater engineers work in Egypt in ....

a. Wadi El Hitan Reserve b. Bahr El Baqar Plant

c. Qarun Lake d. electrical power plants

2 School Book Questions on Unit 4

Choose the correct answer:

1. The idea of a sundial depends on the ....
   a. formation of shadows
   b. rotation of an object around its axis
   c. motion of the moon
   d. falling objects under the effect of gravity

2. If an object is projected vertically upwards, the object ....
   a. returns again to the Earth under the effect of gravity
   b. floats in space because there is no gravity
   c. clings because its gravity is equal to that of the Earth
   d. moves fast towards space

3. The force which is originated between two touching surfaces and slows the motion is called .... force.
   a. pushing b. dragging c. friction d. pulling

4. The acting force on the moon that makes it orbit the Earth is ....
   a. the Earth's gravity b. the Sun's gravity
   c. the moon's gravity d. Mars's gravity

5. A parachute helps in ....
   a. increasing the velocity of the object falling to the ground
   b. slowing down the velocity of the object falling to the ground
   c. decreasing the air resistance against the falling object
   d. increasing the drag pf the object towards the gravity

6. The moon orbiting the Earth, and the reflection of sunlight on it, leads to the formation of ....
   a. constellations b. circular motion
   c. planets attraction d. moon phases

7. Planets continue revolving around the Sun in fixed orbits under the effect of the ....
   a. Earth's gravity b. Sun's gravity
   c. planets gravity d. moon's gravity

8. From the materials which are attracted to the magnet are ....
   a. iron and nickel b. aluminum and copper
   c. silver and gold d. aluminum and silver

9. The sequence of day and night is due to the ....
   a. revolution of the moon around the Earth
   b. revolution of the Earth around the Sun
   c. rotation of the moon around its axis
   d. rotation of the Earth around its axis

10. The illuminated moon in the shape of a circle is called ....
    a. Full Moon
    b. Gibbous
    c. First Quarter
    d. First Crescent

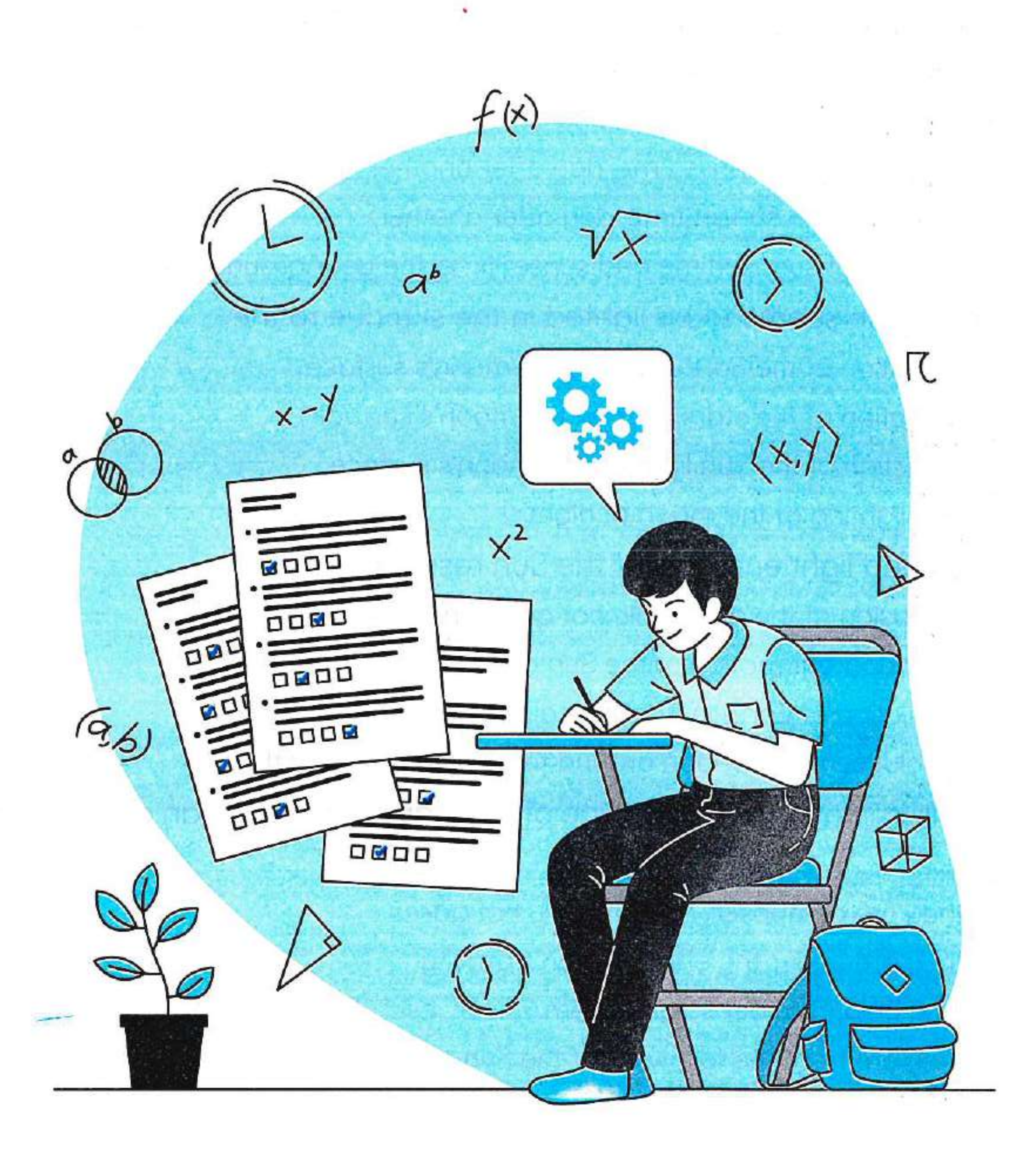
11. One of the results of the revolution of the Earth in an elliptical orbit around the Sun and the inclination of its axis is the ....
    a. differences in sunrise time and sunset time, day after another
    b. differences in sunrise time, day after another
    c. differences in sunset time, day after another
    d. stability of sunrise time and sunset time, the year around

12. The moon seems to be lighted in the sky due to the ....
    a. reflection of the Earth light on the moon's surface
    b. reflection of the stars light on the moon's surface
    c. reflection of the Sun light on the moon's surface
    d. self-lighting of the moon at night

13. Heat and light energies of the Sun result from the ....
    a. explosion of the extremely hot gases inside the Sun
    b. the apparent motion of the Sun daily
    c. revolution of Earth in an elliptical orbit around the Sun
    d. revolution of the moon around the Earth in front of the Sun

14. The illumination and the shine of the stars in the sky is an evidence that ....
    a. they are composed of extremely hot gases
    b. they are under the effect of Sun's gravity
    c. they belong to our solar system
    d. they are from the followers of the Sun

Government Exams



1 Cairo – Nasr City Directorate

Q1. (A) Choose the correct answer:

1. The hydrosphere includes all the following items, except ....
   a. oceans   b. rivers   c. molten rocks   d. groundwater
2. The basic liquid matter which is needed by humans, animals, and plants to survive is ....
   a. milk   b. water   c. oil   d. alcohol
3. Magnetism is a kind of .... force.
   a. attraction only   b. repulsion only   c. visible   d. invisible
4. The day and night phenomenon occurs due to the rotation of the Earth around ....
   a. the Sun   b. its axis   c. the moon   d. the solar system

(B) Give a reason for: Earth's gravity is greater than the moon's gravity.

....

Q2. (A) Put (✓) or (✗):

1. Earth's systems don't interact with each other. (   )
2. The high quality of fresh water leads to death of marine organisms that live in it. (   )
3. The Sun revolves around the Earth. (   )
4. The sunrise and sunset occur at the same time every day. (   )

(B) Write the scientific term:

- It is a phenomenon that takes place in oceans and seas due to the gravity of the moon. (..................)

Q3. (A) Correct the underlined words:

1. The center of the solar system is the Earth. (..................)
2. The Sun is a planet that can give out light. (..................)
3. During the water cycle in nature, water evaporates into water vapor, forming rains. (..................)
4. Shallow areas of oceans don't receive sunlight. (..................)

(B) Cross out the odd word:

- Cresent – Full Moon – Shadow – Gibbous (..................)

2 Cairo Governorate – Heliopolis Directorate

Q1. (A) Choose the correct answer:

1. .... is/are part(s) of the hydrosphere.
   a. Water b. Air c. Rocks d. Plants
2. Among the sources of fresh water are ....
   a. oceans b. seas c. rivers d. salty lakes
3. Gravity makes the moon revolve around ....
   a. the Sun b. the Earth c. itself d. another moon
4. Day and night are formed due to the rotation of the Earth around ....
   a. the Sun b. its axis
   c. the moon d. the solar system

B) Give a reason for:

- The atmosphere is very important for plants.

....

Q2. (A) Put (✓) or (✗):

1. Some animals and plants live in water. ( )
2. Dams can hold water behind them. ( )
3. Tides are affected by the gravity of the moon. ( )
4. The Sun rises in the west. ( )

(B) What happens if: People don't conserve fresh water?

....

Q3. (A) Cross out the odd word:

1. Tree – Birds – Girl – Rocks (....................)
2. Oxygen – Nitrogen – Carbon dioxide – Water (....................)
3. Air resistance – Friction – Magnetism – The Sun (....................)
4. First Crescent – New Moon – Full Moon – Earth (....................)

(B) Write the scientific term:

It is the breakdown of rocks by wind or water. (....................)

3 Giza Governorate – Osim Directorate

Q1. (A) Put (✓) or (✗):

1. Salt water represents 96.5 % of the water on Earth. ( )
2. Rivers and streams are flowing bodies of fresh water. ( )
3. The magnet can exert a pulling force only. ( )
4. Earth pulls objects towards its moon. ( )

(B) Give a reason for: The phenomenon of day and night occurs.

....

Q2. (A) Choose the correct answer:

1. Mountains and valleys are parts of the ....
   a. biosphere b. atmosphere c. geosphere d. hydrosphere
2. .... are formed when water collects in low-lying areas.
   a. Seas b. Lakes c. Rivers d. Oceans
3. .... is considered a type of friction force.
   a. Air resistance b. Gravity c. Magnetism d. Electricity
4. All the following materials can be used to filter wastewater in a simple water filter, except ....
   a. cotton b. sand c. wood d. charcoal

(B) Cross out the odd word: Stream – Ponds – Rocks – Rivers(....................)

Q3. (A) Use the words between the brackets to complete the following sentences:

(fresh – biosphere – solar system – an estuary)

1. We must take a quick shower to conserve .... water .
2. When a river meets a sea, ... is formed.
3. The .... contains the Sun and eight planets revolving around it.
4. The .... is the system that includes all living organisms on Earth.

(B) What happens if: Half of the Earth faces the Sun?

....

4 Giza Governorate – 6th October Directorate

Q1. (A) Choose the correct answer:

1. All the following materials are attracted to the magnet, except ....
   a. iron b. nickel c. wood d. cobalt
2. When a river water meets a sea, ... is formed.
   a. a lake b. a wetland c. an estuary d. an ocean
3. Clothes are made from plants, such as ....
   a. corn b. cotton c. tree d. bean
4. Air resistance is a type of .... force.
   a. friction b. gravity c. repulsion d. pulling

(B) Give a reason for:

The moon is a dark body, but we see it shiny at night.

....

Q2. (A) Put (✓) or (✗):

1. The frozen water on Earth is a part of the geosphere. (   )
2. Jupiter is the fastest planet that rotates on its axis. (   )
3. Salamanders and frogs live in streams. (   )
4. Without the gravity of the Sun, the planets would float off into space. (   )

(B) What happens if: The Earth rotates on its axis?

....

Q3. (A) Correct the underlined words:

1. A rat that digs a burrow in the soil represents an interaction between the biosphere and the hydrosphere. (........)
2. Stars are made up of hot liquids. (........)
3. The gravity of the Sun affects the ocean tides. (........)
4. The type of water in rivers is salty water. (........)

(B) Cross out the odd word:

Cresent – Full Moon – Earth – Gibbous (........)

5 Alexandria Governorate – East Directorate

Q1. (A) Choose the correct answer:

1. The phase of the moon that appears on the last day of the lunar month is the .... phase.
   a. Crescent b. New Moon c. Full Moon d. Gibbous
2. A/An .... is a large body of water surrounded by land.
   a. lake b. estuary c. stream d. pond
3. The gravitational force of an object .... as its mass decreases.
   a. equals zero b. decreases c. increases d. doesn't change
4. The constellations appear at .... positions in the sky during the year.
   a. the same b. different c. small d. center

(B) What happens if: The river water meets the sea water?

Q2. (A) Complete the following sentences:

1. As the distance between the moon and Earth increases, the attraction of gravity between both of them ....
2. Wastewater engineers design ways to protect a community from ....
3. A parachute in the air is affected by some forces, such as gravity and .... force.
4. Most of the fresh water on Earth is found in the form of frozen water called ....

(B) Give a reason for: The stars appear bright in the sky.

Q3. Write the scientific term:

1. It is a force that slows down moving objects and opposes their motion. (....................)
2. It is a dark celestial body that revolves around the Earth and reflects the sunlight. (....................)
3. It is a pulling force that causes the objects to fall toward the Earth's surface. (....................)
4. It is a phenomenon that occurs when the Earth rotates on its axis. (..............)
5. It is a system that is formed of the Sun and eight planets revolving around it. (....................)

6 Alexandria Governorate – Montazah 1 Directorate

Q1. (A) Choose the correct answer:

1. A table standing on the ground needs .... to move.
   a. sunlight b. mass c. force d. air
2. Which of the following is a part of the biosphere?
   a. Ice b. Clouds c. Water d. Animals
3. A group of stars that makes a certain shape in the sky is called ....
   a. solar system b. universe c. constellation d. ecosystem
4. .... are formed when water collects in low-lying areas.
   a. Seas b. Lakes c. Rivers d. Oceans

(B) Give a reason for: Scientists tend to preserve fresh water on Earth.

Q2. (A) Put (✓) or (✗):

1. Gravity pulls objects towards the center of the Earth. (   )
2. A river flows from an area of a lower place to an area of a higher place. (   )
3. Earth rotates on its axis in a clockwise direction. (   )
4. Dams can be used to filter polluted water to be used again. (   )

(B) What happens if: Plants can't get carbon dioxide gas from the air?

Q3. (A) Use the words between the brackets to complete the following sentences:

(seas - pollutants - east - Earth - Sun)

1. The moon moves around the .... due to gravity.
2. Starfish and Moses fish live in ....
3. In the early morning, the Sun would be at the .... direction in the sky.
4. Wastewater engineers can test the quality of water by checking the amount of .... in water.

(B) Write the scientific term:

- It is a force that pulls objects down toward the Earth's center. (....................)

7 Alexandria Governorate – Montazah 2 Directorate

Q1. (A) Use the words between the brackets to complete the following sentences:

(gravity – biosphere – lakes – rivers)

1. Microorganisms are parts of the ....
2. Among the sources of fresh water are ....
3. The force of .... keeps the planets revolving around the sun.
4. .... are large bodies of water surrounded by land.

(B) Give a reason for:

- The moon is a dark body, but we see it shiny at night.

....

Q2. (A) Put (✓) or (✗):

1. 96.5 % of water on Earth is salt water. (   )
2. The magnet can exert a pulling force only. (   )
3. An estuary is formed when salt water mixes with fresh water. (   )
4. The Earth's revolution around the Sun causes day and night. (   )

(B) Cross out the odd word: Catfish – Starfish – Kelp – Dolphin(..................)

Q3. (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 Moses fish	a. can be used in making plastics.
2 Salmon	b. lives in fresh water.
3 Oil prouducts	c. lives in salt water.
4 Cotton	d. can be used in making cans.
	e. can be used in making clothes.

1 .... 2 .... 3 .... 4 ....

(B) Write the scientific term:

- It is a pull or a push applied to an object. (..................)

8 Alexandria Governorate – Middle Directorate

Q1. (A) Put (✓) or (✗):

1. The Sun is the biggest star in the universe. ( )
2. The water of tributaries flows directly into the seas or oceans. ( )
3. Constellations have similar shapes in the sky. ( )
4. You must decrease the time of taking a shower to conserve fresh water. ( )

(B) Give a reason for: The moon is a dark body but we see it shiny at night.

Q2. (A) Choose the correct answer:

1. The presence of sharks in oceans represents an interaction between the .... and the ....
   a. geosphere – biosphere　b. atmosphere – hydrosphere
   c. hydrosphere – biosphere　d. geosphere – atmosphere
2. Magnetism is a kind of .... force(s).
   a. repulsion only　b. attraction only
   c. repulsion and attraction　d. visible and Invisible
3. The amount of salt water is .... the amount of fresh water on Earth.
   a. greater than　b. smaller than　c. equal to　d. half
4. Friction force .... the movement of objects.
   a. slows down　b. speeds up　c. increases　d. doesn't affect

(B) What happens if: The quality of fresh water becomes poor?

Q3. (A) Choose from column (A) what suits it in column (B):

Column (A)	Column (B)
1 The Sun	a. contains animals and plants.
2 Geosphere	b. is the center of the solar system.
3 Force	c. contains rocks and sand.
4 Biosphere	d. is a pull or a push that affects objects.

1 .... 2 .... 3 .... 4 ....

(B) Write the scientific term:

It is a pulling force that causes objects to fall down toward the Earth.(....................)

9 Sharkia Governorate – Educational Directorate

Q1. (A) Complete the following sentences:

1. The first moon phase is ....
2. The percentage of salty water is about .... % of the hydrosphere.
3. Rocks and mountains are from the Earth's .... system.
4. Planets revolve around the Sun under the effect of ....

(B) Give a reason for: The moon's gravity is less than the Earth's gravity.

Q2. (A) Put (✓) or (✗):

1. Living organisms need water to drink. ( )
2. The day and night phenomenon occurs due to the revolution of Earth around the Sun. ( )
3. From the risks that threaten the world are large quantities and poor quality of water. ( )
4. Gravity depends on an object's mass and distance. ( )

(B) What happens if: Half of the Earth faces the Sun?

Q3. (A) Choose the correct answer:

1. A force of .... causes the slow down of an object's motion.
   a. gravity b. friction c. magnetism
2. All the following belong to the geosphere, except ....
   a. minerals b. rocks c. helium
3. If the distance between the Earth and the moon decreases, the gravity between them ....
   a. decreases b. increases c. doesn't change
4. The place where a river meets a sea is called ....
   a. a river b. an ocean c. an estuary

(B) From the opposite figure, complete:

1. This figure represents constellation ....
2. This constellation consists of a group of ....

10 Dakahlia Governorate – Educational Directorate

Q1. (A) Choose the correct answer:

1. .... is an example of a saltwater ecosystem.
   a. The Nile River b. Assal lake c. A glacier d. Nasser lake
2. From the materials that are attracted to the magnet are ....
   a. iron and nickel b. aluminum and copper
   c. copper and silver d. silver and gold
3. Which of the following is a part of the geosphere ?
   a. Rocks b. Clouds c. Water d. Animals
4. Planets continue revolving around the Sun in fixed orbits under the effect of ....
   a. Earth's gravity b. Mars's gravity
   c. the Sun's gravity d. the moon's gravity

(B) Give a reason for: The moon has different phases during the lunar month.

Q2. (A) Put (✓) or (✗):

1. The Sun is the biggest star in the universe. ( )
2. The sequence of day and night is due to the rotation of Earth around its axis. ( )
3. Photosynthesis results from an interaction between the biosphere and the atmosphere. ( )
4. Water that covers most of the Earth's surface is fresh water in rivers. ( )

(B) Which body does the Earth attract more: one with a mass of 100 kg or one with a mass of 400 kg, and why?

Q3. (A) Complete the following sentences:

1. The force which is originated between two touching surfaces and slows the motion is called ....
2. The illuminated moon in the shape of a circle is called ....
3. 96.5% of the Earth's water is .... water.
4. A group of plants and animals which live together in a large area characterized by its climate is called ....

(B) What happens to: A tree's shadow in the morning and at noon?

11 Qalioubia Governorate – Educational Directorate

Q1. (A) Choose the correct answer:

1. Rocks are broken down into smaller particles during the .... process.
   a. photosynthesis b. weathering c. erosion d. respiration
2. .... is a land partially covered with water.
   a. An ocean b. A wetland c. An estuary d. A lake
3. The gravity of .... affects the ocean tides on the Earth.
   a. the Sun b. the moon c. Mars d. Jupiter
4. The day and night phenomenon occurs due to the rotation of the Earth around ....
   a. the Sun b. its axis c. the moon d. the solar system

(B) Classify the following to revolution or rotation:

1. It is the spinning of an object around an axis. (....................)
2. It is the spinning of an object around another object. (....................)

Q2. (A) Complete the following sentences:

1. Water is renewed in nature through ....
2. When a stream or a river receives more rainfall, this leads to ....
3. The gravity of an object increases as its .... increases.
4. The cycle of .... happens due to Earth's revolution around the Sun.

(B) Write the scientific term:

- It is an area of land where water from different sources flows towards a common location. (....................)

Q3. (A) Put (✓) or (✗):

1. Most of the fresh water on the Earth is found as a liquid or a running water. ( )
2. Recycling wastewater means removing waste materials from it. ( )
3. Gravity only affects objects in motion. ( )
4. In the Full Moon phase, we can't see the moon in the sky. ( )

(B) Cross out the odd word:

- At noon – In the morning – In the afternoon – Longer shadow(....................)

12 Beheira Governorate – Educational Directorate

Q1. (A) Choose the correct answer:

1. Which of the following is a part of the biosphere?
   a. Water b. Clouds c. Animals
2. .... are formed when water collects in low-lying areas.
   a. Seas b. Lakes c. Rivers
3. The center of the solar system is the ....
   a. Sun b. Earth c. moon
4. The force that causes skydivers to move downward is called ....
   a. gravity of Earth b. gravity of the moon
   c. gravity of the Sun

(B) What happens to: The planets if the Sun has no gravity?

Q2. (A) Complete the following sentence:

1. In the solar system, all planets revolve in fixed paths called ....
2. .... is the system that includes all landforms on the Earth's surface, such as mountains and valleys.
3. The wide space that contains celestial objects is called ....
4. Earth rotates around itself every .... hours.

(B) Give a reason for: There is no fish or aquatic animals living in Assal lake?

Q3. (A) Put (✓) or (✗):

1. Galileo binoculars help scientists see distant objects in space with more details. (   )
2. A watershed is an area of land where all the water that falls within it flows toward a single place. (   )
3. Air resistance is a type of friction force that can be seen easily. (   )
4. Earth's systems are divided into three systems: atmosphere, biosphere, and hydrosphere. (   )

(B) Look at the figure below, then complete the following sentences:

1. .... has the largest mass.
2. .... has the lowest force of gravity.

13 Kafr El-Shiekh Governorate – Educational Directorate

Q1. (A) Choose the correct answer:

1. A/An .... is a building with a dome ceiling and is used to see images of some celestial bodies.
   a. telescope **b.** planetarium **c.** constellation **d.** ecosystem
2. All the following materials are attracted to the magnet, except ....
   a. iron **b.** nickel **c.** wood **d.** cobalt
3. .... belong to the biosphere in an ocean ecosystem.
   a. Salamanders **b.** Kelps **c.** Mountains **d.** Plains
4. When wind blows the seeds of plants, there's an interaction between the biosphere and the ....
   a. atmosphere **b.** lithosphere **c.** geosphere **d.** hydrosphere

(B) Write the scientific term:

- It is a group of stars, planets, and gases held together by gravity. (....................)

Q2. (A) Put (✓) or (✗):

1. Earth rotates on its axis slower than Jupiter. (   )
2. The moon appears in the New Moon, when Earth is between the moon and the Sun. (   )
3. Air resistance speeds up a falling parachute downward. (   )
4. Resources sustainability isn't affected by overpopulation. (   )

(B) Give a reason for: The four seasons cycle occurs.

Q3. (A) Use the words between the brackets to complete the following sentences:

(shortest – high – a sea – less than – an estuary – more than)

1. The gravity of the moon is .... the gravity of the Earth.
2. The amount of frozen fresh water is .... the liquid fresh water on Earth.
3. The flow of a river ends when it meets ...., where .... is formed.
4. At noon, the Sun is .... and most directly above us in the sky, so it forms the .... shadow.

(B) What happens when: Water collects in a low-lying area?

14 Damietta Governorate – Educational Directorate

Q1. (A) Choose the correct answer:

1. The fastest planet that rotates on its axis in the solar system is ....
   a. Earth b. Jupiter c. the moon d. the Sun
2. Mountains and valleys are parts of the ....
   a. biosphere b. atmosphere c. geosphere d. hydrosphere
3. From the materials which are attracted to the magnet are ....
   a. iron and nickel b. aluminum and copper
   c. copper and silver d. silver and gold
4. Seas and oceans water meet rivers water at ....
   a. streams b. groundwater c. estuaries d. watersheds

(B) Give a reason for: The phenomenon of day and night occurs.

Q2. (A) Write the scientific term:

1. It is a group of stars that forms a pattern in the sky. (........)
2. It is the action of controlling or managing human access to natural resources or using them. (........)
3. It is an imaginary line passing through the two poles of Earth. (........)
4. They are bodies of water that surround the continents. (........)

(B) What happens to: The ball when it is thrown up into the air?

Q3. (A) Correct the underlined words:

1. The moon phase at which the moon seems completely bright is <u>Gibbous</u>. (........)
2. Some animals live in <u>ponds</u>, such as catfish and salmon.(........)
3. The Earth revolves around the Sun in a <u>rectangular</u> shaped orbit. (........)
4. Cotton, charcoal, and <u>mud</u> can be used in making a simple water filter. (........)

(B) Complete the following statement by using these words:

(telescope – sundial – shadow)

The first time piece that was used to know the time is called a ...., and it depends on the formation of a ....

15 Port Said Governorate – Educational Diroctorete

Q1. (A) Choose the correct answer:

1. Which of the following is part of the biosphere?
   a. Ice b. Clouds c. Animals d. Water
2. .... are parts of the geosphere.
   a. Plants b. Rocks c. Gases d. Bodies of water
3. We can see thousands of .... in the night sky, which give off light and heat.
   a. moons b. stars c. planets d. satellites
4. From the materials that are attracted to the magnet is ....
   a. iron b. copper c. silver d. gold

(B) Write the scientific term:

- It contains the Sun and eight planets revolving around it. (....................)

Q2. (A) Put (✓) or (✗):

1. Rivers and streams are flowing freshwater bodies. ( )
2. Fresh water represents 96.5% of the water on Earth. ( )
3. All parts of the Earth receive sunlight at the same time. ( )
4. Earth revolves around the Sun in a fixed path. ( )

(B) Give a reason for: The moon is a dark body, but we see it shiny at night.

....

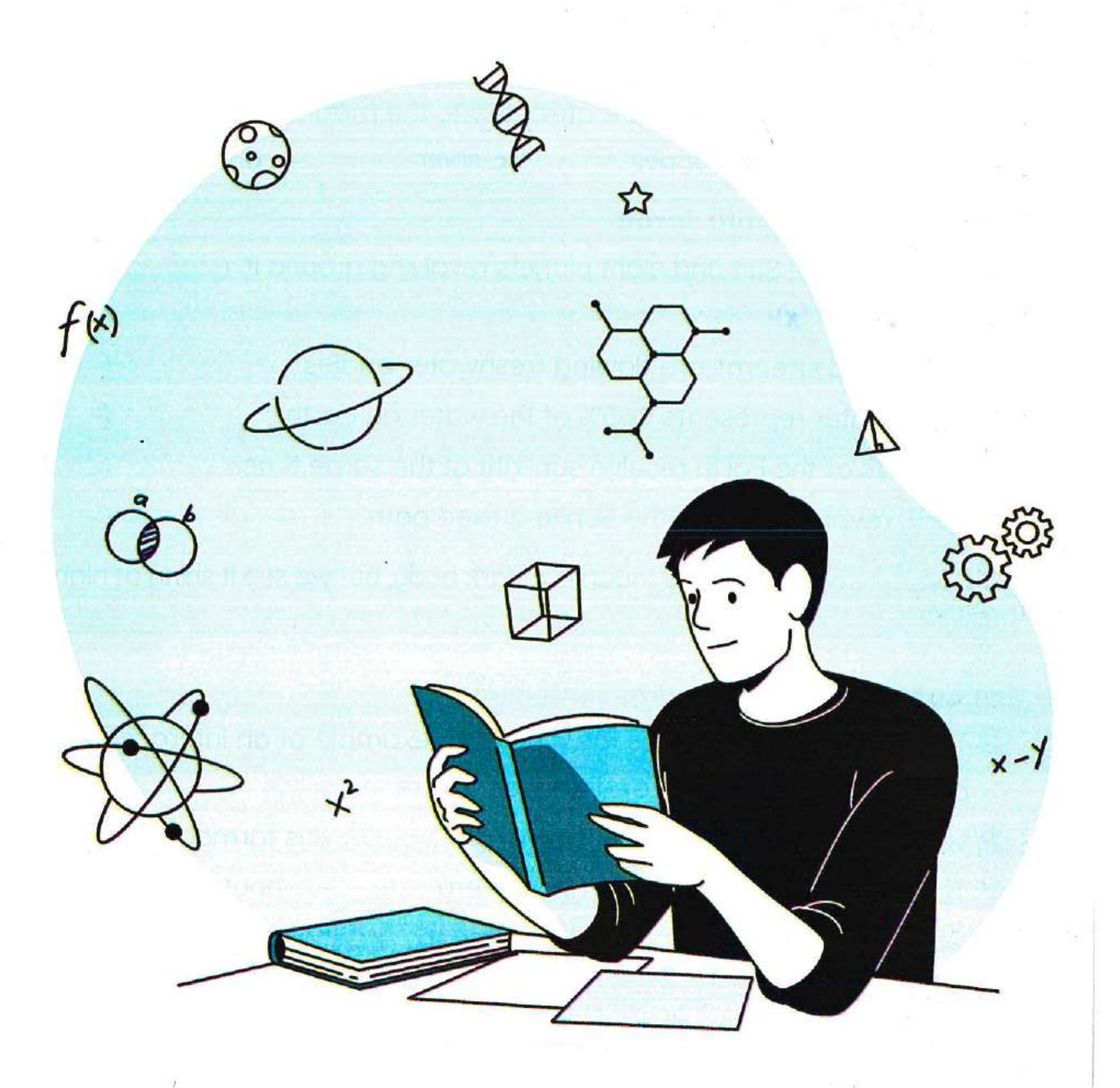
Q3. (A) Complete the following sentences:

1. The water running across the land is an example of an interaction between the .... and the geosphere.
2. When a river water meets a sea, a/an .... is formed.
3. The Earth rotates on its axis once every .... hours.
4. Objects move down from a high place toward the ground due to the effect of ....

(B) What happens if: Earth doesn't rotate on its axis?

....

Model Answers



Unit 3

Concept 3.1

Lesson 1

1 1 d 2 c 3 b 4 a 5 b 6 c 7 b 8 c 9 c 10 b

2 1 ✗ 2 ✗ 3 ✗ 4 ✓ 5 ✗ 6 ✓ 7 ✓

3 1 blue 2 three 3 atmosphere 4 ice

4 1 Atmosphere 2 Biosphere 3 Geosphere 4 Hydrosphere 5 Freezing 6 Evaporation 7 Erosion 8 Weathering

5 1 geosphere 2 solid 3 Biosphere 4 erosion 5 liquid – gas 6 rocks – weathering

6 1 Erosion 2 Sand

7 1 c 2 d 3 a 4 b

8
1. Because nearly three-quarters (71%) of the Earth is covered by water.
2. Because water leads to the weathering and erosion of rocks.
3. Because plants need water to grow and survive.

9
1. The water will change into water vapor.
2. All the living organisms will die.

10 1 (4) 2 (1) 3 (2) 4 (3)
5 Water will freeze and become ice.

Concept 3.1

Lesson 2

1 1 b 2 b 3 c 4 c 5 d 6 d 7 c 8 d 9 b 10 c 11 b 12 a 13 a

2 1 ✗ 2 ✓ 3 ✗ 4 ✗ 5 ✓ 6 ✗ 7 ✗ 8 ✗ 9 ✓

3 1 salt 2 atmosphere 3 clouds 4 fresh 5 geosphere

4 1 Lake 2 Ocean 3 River 4 Groundwater 5 Renewable resources 6 Water cycle

5 1 Lakes 2 fresh- salt 3 hydrosphere 4 Water cycle 5 evaporates – clouds 6 Biosphere 7 rocks- geosphere 8 hydrosphere – biosphere

6 1 Rocks 2 Rain 3 Rocks

7 1 b 2 a 3 d 4 c

8
1. Because worms belong to the biosphere, and they hide inside the soil, which belongs to the geosphere.
2. Because sand belongs to the geosphere, and water belongs to the hydrosphere.

3 Because plants can be planted from seeds that grow up to form new plants.

4 Because water can be replaced (renewed) in nature during the water cycle.

9

	Area "A"	Area "B"	Area "C"
1		✓	
2	✓		
3			✓
4	✓		
5		✓	

Concept 3.1
Lesson 3

1 1 c 2 c 3 c 4 d
5 c 6 d 7 b 8 d
9 b 10 c 11 d 12 c

2 1 ✗ 2 ✓ 3 ✓ 4 ✓
5 ✗ 6 ✓ 7 ✓ 8 ✗
9 ✓ 10 ✓ 11 ✗ 12 ✓
13 ✗ 14 ✓

3 1 atmosphere 2 water
3 hydrosphere 4 Salt
5 fresh 6 fresh

4 1 Biome 2 Geosphere
3 Atmosphere 4 Hydrosphere
5 Salt water 6 Biosphere

5 1 glaciers 2 less
3 biome
4 biosphere – atmosphere
5 96.5% 6 geosphere
7 more 8 salt
9 hydrosphere – geosphere

6 1 Molten rocks 2 Oceans
3 Photosynthesis

7 1 b 2 a 3 d 4 c

8 1 Because the shape of Earth is very close to a sphere.
2 Because it represents an interaction between the hydrosphere and the geosphere.
3 Because most of the fresh water is found in the form of frozen water as large pieces of ice called glaciers.
4 Because plants absorb carbon dioxide from the atmosphere and release oxygen during the photosynthesis process.

9 1 They can't make the photosynthesis process.
2 The life on Earth would be impossible.

10 1 fresh water 2 area B
3 hydrosphere 4 biosphere

Concept 3.1
Lesson 4

1 1 c 2 c 3 b 4 c
5 d 6 d 7 b 8 d
9 c

2 1 ✓ 2 ✗ 3 ✗ 4 ✗
5 ✗ 6 ✗ 7 ✓ 8 ✗
9 ✗

3 1 Intertidal zones 2 Shallow areas

4 1 freshwater – saltwater

2 Lake Nasser - ponds , Lake Bardawil
3 intertidal zones 4 abyssal zones

5
1 Oceans 2 Nile river
3 Lake Nasser

6
1 Because the abyssal zones are very deep so sunlight can't reach them.

2 Because it has a high concentration of natural salts.

3 Because during summer, some lakes may dry up.

7
1 Intertidal zones will disappear.

8
1 ✗ 2 ✗ 3 ✗ 4 ✗
5 ✓

Concept 3.1
Lesson 5

1
1 c 2 b 3 d 4 b
5 d 6 a 7 d

2
1 ✗ 2 ✗ 3 ✗ 4 ✗
5 ✗ 6 ✓ 7 ✗

3
1 oceans 2 streams
3 ocean currents
4 Water lily - kelp

4
1 Catfish 2 Starfish

5
1 c 2 b 3 a

6
1 Because frogs live in still fresh water but catfish live in running fresh water.

Concept 3.2
Lesson 1

1
1 b 2 d 3 a 4 d
5 b 6 d 7 b 8 a
9 b 10 b 11 c 12 d
13 b

2
1 ✓ 2 ✓ 3 ✓ 4 ✗
5 ✓ 6 ✓ 7 ✗ 8 ✓
9 ✗ 10 ✓

3
1 wetlands 2 mountains
3 geosphere 4 oceans

4
1 Lake 2 Estuary
3 Wetland 4 Fresh water
5 Oceans

5
1 generate electricity
2 fresh water 3 Lake
4 groundwater 5 estuary
6 rivers 7 estuary
8 river 9 ocean - plains

6
1 Seas 2 Oceans

7
1 To conserve fresh water because it is limited on the Earth.
2 Because all living organisms need fresh water to survive.
3 Because water in an estuary is a mixture of salt water and fresh water.
4 Because most of the water on the Earth's surface is salt water.

8
1 We can't find fresh water to drink.
2 An estuary is formed.
3 A lake may be formed.

9
1 (2) 2 (3) 3 (1)
4 mountains - stream

Concept 3.2
Lesson 2

1
1. a 2. b 3. c 4. d
5. c 6. b 7. c

2
1. ✗ 2. ✗ 3. ✓ 4. ✓
5. ✗ 6. ✗ 7. ✗

3
1. Watershed 2. Fresh water

4
1. freshwater – rivers
2. decreases – drought
3. flooding 4. Watershed

5
1. Because all living organisms need fresh water to survive.
2. Because the poor quality of water leads to death or extinction of many living organisms.
3. Due to the poor quality of freshwater.
4. To generate electricity.

6
1. It will cause the death or extinction of some marine organisms.
2. The water level will increase causing floods.
3. It will cause drought.

7
1. a watershed
2. area B - area A
3. a lake

Concept 3.2
Lesson 3

1
1. d 2. d 3. c 4. b
5. c 6. b 7. c

2
1. ✓ 2. ✗ 3. ✓ 4. ✗
5. ✗ 6. ✗ 7. ✓ 8. ✓

3
1. Tributaries

4
1. tributary – wind
2. quality 3. amount
4. Dams

5
1. Because the wastes of farms will be carried by the river to downstream areas.
2. Because all water bodies are connected together.

6
1. The waste of the factory will be carried by the water to downstream areas.
2. The dam will hold water behind it and the level of water changes in areas near dam.
3. The waste of the farm will be carried to the tributary and causing water pollution
4. It will cause water pollution which will affect downstream areas.

7
1. ✓ 2. ✗ 3. ✓ 4. ✓
5. ✓

Concept 3.2
Lesson 4

1
1. b 2. c 3. b 4. c
5. a 6. d 7. d 8. d
9. d 10. b 11. c 12. d

2
1. ✓ 2. ✗ 3. ✓ 4. ✗
5. ✗ 6. ✗ 7. ✗ 8. ✓
9. ✓ 10. ✗ 11. ✗ 12. ✓

3
1. animals 2. South Sinai
3. decreasing 4. erosion
5. decrease

4 1 Preservation 2 Sustainability

5 1 plants – animals
2 deforestation – soil erosion
3 fossil fuel – death
4 Preservation

6 1 c 2 b 3 a

7 1 To conserve fresh water.
2 Because wind and water carry away soil causing soil erosion.

8 1 The wells will dry up, and there will be no water to drink.
2 It will lead to deforestation.
3 It will lead to soil pollution that leads to the death of animals and plants.

9 1 A 2 B 3 A

10 1 b 2 c 3 c 4 a
5 b

Concept 3.2
Lesson 5

1 1 c 2 c 3 c 4 a
5 b 6 a 7 c 8 a
9 b

2 1 ✓ 2 ✓ 3 ✗ 4 ✓
5 ✓ 6 ✗ 7 ✓ 8 ✗
9 ✗

3 1 Wastewater
2 Wastewater engineers
3 Wastewater engineers
4 Waste Water Treatment plants

4 1 charcoal – sand 2 wastewater
3 water cycle 4 Recycle
5 water – pollutants 6 floods
7 water treatment plants
8 rivers – lakes

5 1 To make sure that the water is safe.
2 To reuse water for many purposes.

6 The water will be polluted and become undrinkable.

7 1 Simple filter model
2 A. Dirty water B. Sand
C. Charcoal D. Cotton
E. Filtered water
3 It helps us remove harmful materials from the polluted water.
4 Recycling wastewater

Unit 4

Concept 4.1
Lesson 1

1 1 c 2 d 3 b 4 a
5 b 6 d

2 1 ✓ 2 ✓ 3 ✓ 4 ✓
5 ✗ 6 ✗

3 1 Earth's Gravity 2 Gravity
3 Ocean tides

4 1 Earth 2 Sun – orbits
3 gravity 4 moon

5 1 moon 2 pulls
3 center

6 1 Due to the gravity that pulls the pen down toward the ground.
2 Because the gravity between the Sun and planets keeps planets revolving in fixed orbits in the solar system.

7
1. The ball falls toward the ground due to the Earth's gravity.
2. The moon will float off into space.

Concept 4.1
Lesson 2

1
1 d 2 b 3 d 4 b
5 c 6 d 7 d 8 c
9 d 10 b

2
1 ✗ 2 ✗ 3 ✓ 4 ✗
5 ✓ 6 ✓ 7 ✓ 8 ✓

3
1 Force 2 Gravity
3 Magnetism

4
1 more 2 push
3 Magnetism 4 invisible

5
1 pull 2 increase
3 Force 4 less
5 more 6 magnetism
7 magnetism 8 force
9 increase 10 increases

6
1 b 2 c 3 a

7
1. Because as the distance between the two objects increases, the gravity between them decreases and vice versa.
2. Because the magnet has a force called magnetism that attracts paperclips to it.
3. Due to the gravitational force of the Earth.
4. Because Earth has a bigger mass than that of the moon.

8
1. The gravitational force between them decreases, and the moon may float off into space.
2. The gravity between the moon and the Earth decreases, so the moon might float off into space.
3. The magnet will attract the paper clips.
4. The gravity between the moon and the Earth increases, so the moon might crash into Earth.

9
1 b 2 a 3 b 4 a

10
1. The body with mass 400 kg, because the gravitational force of an object increases when its mass increases.

Concept 4.1
Lesson 3

1
1 a 2 b 3 b 4 b
5 d 6 c 7 c 8 d

2
1 ✓ 2 ✗ 3 ✗ 4 ✗
5 ✓ 6 ✓ 7 ✗ 8 ✓

3
Gravity

4
1 gravity 2 less
3 center 4 center
5 pulling - direction

5
1 gravity 2 direction
3 less

6
1. Because there is no gravity in space.
2. Because the direction of your body changes because gravity pulls it downward.
3. Because the moon has less mass than the Earth.

7 1 The direction of the ball changes due to the force of gravity.
2 All objects on Earth will float off into space.
3 All planets will float off into space and leave their orbits around the Sun.

8 1 Sun 2 moon

9 1 ✗ 2 ✗ 3 ✗ 4 ✓

10 1 ✓ 2 ✗ 3 ✗

11 (1) - (2)

12 1 90° - gravity 2 80° 3 110°

Concept 4.1
Lesson 4

1 1 c 2 a 3 c 4 a
5 a 6 c 7 c 8 b
9 c 10 c 11 c 12 b

2 1 ✗ 2 ✓ 3 ✗ 4 ✗
5 ✓ 6 ✗ 7 ✗ 8 ✓
9 ✓ 10 ✓

3 1 Friction 2 Magnetism
3 Friction 4 Air resistance
5 Gravity 6 Parachute
7 Law of motion

4 1 slows down 2 Magnetism
3 Air resistance 4 Friction

5 1 gravity 2 friction
3 friction 4 magnetism
5 air resistance 6 friction
7 opposite 8 friction
9 air resistance
10 constant (equal)
11 pulls- gravity

6 1 Sun 2 Wood

7 1 Because the magnet has a pulling force called magnetism that attracts the paperclips towards it.
2 Due to the friction between the tires and ground that slows down the bike until it stops.
3 To increase air resistance to the parachute and slow down his drop.
4 Because air resistance opposes the movement of an object, causing the object to fall down slowly.
5 Because the surface area of the feather is greater than that of the paper clip.

8 1 The iron nails will be attracted to the magnet while the sand won't be attracted to the magnet.
2 Its speed will decrease.
3 The friction force will increase, causing the bike to slow down until it stops.
4 The metal ball will reach the ground first.
5 They will reach the ground at the same time.

9 1 ✗ 2 ✓ 3 ✓

10 1 b 2 a 3 b

Concept 4.1
Lesson 5

1 1 a 2 d 3 b 4 b
5 b 6 c

2
1 ✗ 2 ✓ 3 ✓ 4 ✗
5 ✗ 6 ✓ 7 ✗

3
1 Nicolaus Copernicus
2 Gravity 3 Orbit

4
1 Sun 2 gravity
3 an ellipse 4 orbits

5
1 Because the Sun has the largest gravity in the solar system.
2 Due to the gravity of the Sun.

6
All planets will float off into space and leave their orbits around the Sun.

Concept 4.2
Lesson 1

1
1 d 2 b 3 c 4 c
5 c 6 b 7 d 8 b
9 c 10 c 11 b 12 c

2
1 ✓ 2 ✓ 3 ✓ 4 ✗
5 ✗ 6 ✓ 7 ✗ 8 ✓
9 ✗ 10 ✓ 11 ✗ 12 ✗

3
1 east 2 late afternoon
3 48 hours 4 its axis

4
1 The cycle of day and night
2 Day 3 Night
4 Rotation 5 Earth's axis
6 24 hours (one day)

5
1 day – night
2 east – west , rotation – axis
3 24 4 east – center.
5 revolution 6 Earth's axis

6
1 Rotation 2 Revolution

7
1 Due to the rotation of Earth on its axis.
2 Due to the rotation of Earth on its axis.

8
1 This half of Earth will have a day.
2 The pattern of day and night will occur.
3 Day and night pattern will not occur.

9
1 a 2 b

10
1 ✓ 2 ✗ 3 ✓ 4 ✗

Concept 4.2
Lesson 2

1
1 c 2 d 3 c 4 d
5 b 6 d 7 a 8 d
9 d 10 b

2
1 ✗ 2 ✗ 3 ✗ 4 ✗
5 ✓ 6 ✗ 7 ✓ 8 ✓
9 ✓ 10 ✗ 11 ✗ 12 ✗

3
1 elliptical 2 seasons
3 year 4 24

4
1 Cycle 2 The cycle of seasons
3 Jupiter
4 The solar system
5 The Sun

5
1 The solar system
2 Sun 3 seasons
4 elliptical – axis 5 star – planets
6 counterclockwise, west – east

6
1 d 2 a 3 b 4 c

7
1 Due to the Earth's revolution around the Sun.
2 Due to the Earth's elliptical orbit around the Sun and the tilt of the Earth on its axis.

3 Because Jupiter rotates around its axis with higher speed than that of Earth.

8
1 The cycle of day and night will not occur.
2 The day length will be the same every day throughout the year.
3 The Sun would appear to move in the sky from west to east.
4 The length of day will be equal at both of them.

9 1 b 2 c 3 b

Concept 4.2
Lesson 3

1
1 d 2 d 3 a 4 a
5 c 6 c 7 d 8 c
9 a 10 d 11 c

2
1 ✗ 2 ✗ 3 ✗ 4 ✗
5 ✗ 6 ✓ 7 ✓ 8 ✗
9 ✗ 10 ✓ 11 ✓ 12 ✓
13 ✗ 14 ✓

3
1 high 2 shortest
3 sun 4 east
5 stars 6 far

4 1 Sundial 2 Constellation

5
1 same 2 seasons
3 Sun – lengths
4 sundial – shadow
5 east – longest shadow
6 shortest
7 Orion
8 Earth – axis
9 constellations
10 Sun – constellations

6
1 Because we are moving at the same speed of Earth's rotation on its axis.
2 Due to changing the position of the Sun in the sky throughout the day due to Earth's rotation.
3 Due to Earth's rotation on its axis.
4 Because the part of the night sky we see from a certain place on Earth changes a little bit every night as the Earth revolves around the Sun.
5 Due to the revolution of the Earth around the Sun.

7
1 The shadow length in the morning will be longer than that at noon.
2 Constellations appear at different locations in the sky during different times of the year.

8 1 c 2 b

9 1 Orion 2 stars

Concept 4.2
Lesson 4

1
1 d 2 b 3 b 4 a
5 d 6 c 7 b 8 b
9 b 10 d 11 a 12 d
13 b 14 d 15 c 16 b

2
1 ✓ 2 ✓ 3 ✗ 4 ✓
5 ✗ 6 ✗ 7 ✓ 8 ✓
9 ✗ 10 ✗ 11 ✗ 12 ✓
13 ✓ 14 ✗ 15 ✗ 16 ✓

3
1 star 2 gases
3 reflects 4 stars

5 crescent
6 quarter
7 full moon
8 right

4
1 Stars
2 Moon
3 Lunar month
4 Full moon

5
1 hot gases
2 light – reflects
3 moon – Earth, Sun
4 full moon
5 crescent
6 new moon
7 last
8 Planets
9 full moon – Earth
10 month

6
1 b
2 a
3 d
4 c

7
1 Earth
2 Earth

8
1 Because the moon reflects the sunlight falling on it.
2 Due to the revolution of the moon around Earth.

9
The moon's surface will reflect the sunlight.

10
1 new moon
2 quarter
3 full moon

11
1 ✓
2 ✗
3 ✓

Concept 4.2
Lessons 5 & 6

1
1 b
2 c
3 b
4 d
5 a
6 b
7 a
8 b
9 b
10 b
11 d
12 c
13 b
14 d

2
1 ✗
2 ✓
3 ✓
4 ✓
5 ✗
6 ✓
7 ✗
8 ✓
9 ✗
10 ✓
11 ✗
12 ✓
13 ✓
14 ✗

3
1 Galaxy
2 The Sun
3 Stars
4 Planetarium
5 Planetarium directors

4
1 universe
2 planets – moons
3 thermal
4 atmosphere
5 stars – gravity
6 helium – hydrogen , light
7 very far
8 Binoculars - telescopes
9 Sun

5
1 Because the Sun is nearer to Earth than other stars.
2 Because they are made of hot gases that react with each other, producing heat and light.
3 Due to the presence of the atmosphere that allows some light waves to pass through to Earth while it blocks other light waves.

6
1 The Sun produces light and heat.
2 It will not produce light and heat, so it won't seem shiny.

7
1 ✓
2 ✗
3 ✗
4 ✓
5 ✗
6 ✗

8
1 planetarium
2 planets
3 dome

Assessments on Lessons Model Answers

Assessment 1 | Concept 3.1 | Lesson 1

Q1 (A) 1 b 2 a 3 b

(B) The water evaporates and changes into water vapor.

Q2 (A) ✓

(B) 1 Biosphere 2 Erosion

Q3 (A) Sand

(B) 1 geosphere 2 Hydrosphere

Assessment 2 | Concept 3.1 | Lesson 2

Q1 (A) 1 b 2 a 3 d

(B) Because worms belong to the biosphere, and they hide in the soil, which belongs to the geosphere.

Q2 (A) atmosphere

(B) 1 A lake 2 geosphere

Q3 (A) ✗

(B) 1 A 2 C

Assessment 3 | Concept 3.1 | Lesson 3

Q1 (A) 1 b 2 d 3 d

(B) Because plants take in carbon dioxide from the air to make the photosynthesis process.

Q2 (A) Seas

(B) 1 life 2 atmosphere

Q3 (A) ✗

(B) 1 Biome 2 Salt water

Assessment 4 | Concept 3.1 | Lesson 4

Q1 (A) 1 c 2 d 3 a

(B) The intertidal zones appear.

Q2 (A) salt water

(B) 1 summer 2 fresh – salt

Q3 (A) ✗

(B) 1 Because the abyssal zones are very deep, so sunlight can't reach them.

2 Because Lake Assal contains a high concentration of natural salts.

Assessment 5 | Concept 3.1 | Lesson 5

Q1 (A) 1 c 2 d 3 a

(B) Because frogs live in still fresh water, while dolphins live in salt water.

Q2 (A) ✓

(B) starfish – salt water (oceans)

Q3 (A) Salmon

(B) Salamander: Still fresh water (ponds or lakes)

Trout: Running fresh water (rivers or streams)

Assessment 6 | Concept 3.2 | Lesson 1

Q1 (A) 1 d 2 c 3 b

(B) An estuary will be formed.

Q2 (A) ✓

(B) 1 Lake 2 River

Q3 (A) fresh water

(B) 1 oceans 2 groundwater

Assessment 7 | Concept 3.2 | Lesson 2

Q1 (A) 1 ✓ 2 ✗ 3 ✓

(B) Drinking, irrigation, agriculture, industry, and generating electricity

Q2 (A) c

(B) decrease – drought

Q3 (A) Dam

(B) 1 Because the water level rises.

2 Due to the poor quality of fresh water.

Assessment 8 | Concept 3.2 | Lesson 3

Q1 (A) 1 d 2 d 3 c

(B) 1 Because the waste will be carried by the river to downstream areas.

Q2 (A) ✗

(B) 1 Dams 2 pollution

Q3 (A) ✗

(B) 1 upstream

2 Area (B) will be polluted.

Assessment 9 | Concept 3.2 | Lesson 4

Q1 (A) 1 a 2 d 3 c

(B) Preservation

Q2 (A) ✗

(B) 1 sustainable 2 decreasing

Q3 (A) Trees

(B) 1 This causes pollution to water and soil, so many living organisms will die.

2 This may lead to deforestation and soil erosion.

Assessment 10 | Concept 3.2 | Lesson 5

Q1 (A) 1 ✓ 2 ✗ 3 ✓

(B) The water is polluted and becomes undrinkable.

Q2 (A) b

(B) Wastewater engineers – pollutants

Q3 (A) wastewater

(B) 1 a simple water filter

2 cotton – filtered water

Assessment 11 | Concept 4.1 | Lesson 1

Q1 (A) 1 b 2 d 3 d

(B) Because the gravity of the Sun makes the planets revolve around it in fixed orbits.

Q2 (A) ✗

(B) 1 gravity 2 Earth

Q3 (A) gravity

(B) 1 less 2 moon

Assessment 12 | Concept 4.1 | Lesson 2

Q1 (A) 1 d 2 b 3 c

(B) The gravity between the moon and Earth increases, so the moon is attracted to Earth and might crash into Earth.

Q2 (A) ✓

(B) mass – distance

Q3 (A) Magnetism

(B) Bowling ball

Because it has a greater mass than the basketball

Assessment 13 | Concept 4.1 | Lesson 3

Q1 (A) 1 b 2 b 3 b

(B) Due to the Earth's gravity that pulls you downward toward the Earth's center.

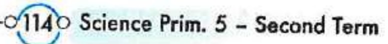
Q2 (A) ✓

(B) less

Q3 (A) direction

(B) 1 Moon – Earth – Sun

2 The Earth will float off into space.



Assessment ⑭ | Concept 4.1 | Lesson 4

Q1 (A) 1 c 2 a 3 b

(B) The metal ball reaches the ground before the feather.

Q2 (A) ✗

(B) 1 Parachute 2 Friction

Q3 (A) Wood

(B) increase - increase

Assessment ⑮ | Concept 4.1 | Lesson 5

Q1 (A) 1 b 2 c 3 a

(B) All planets will float off into space and leave their orbits around the Sun.

Q2 (A) ✗

(B) planets - orbits

Q3 (A) oval (elliptical)

(B) 1 Because the Sun has the largest gravity in the solar system.

2 Due to the gravitational force of the Earth which attracts the moon toward it.

Assessment ⑯ | Concept 4.2 | Lesson 1

Q1 (A) 1 d 2 c 3 b

(B) Due to the rotation of Earth on its axis.

Q2 (A) ✓

(B) 1 Rotation 2 Earth Axis

Q3 (A) revolution

(B) 1 day 2 day and night

Assessment ⑰ | Concept 4.2 | Lesson 2

Q1 (A) 1 d 2 a 3 b

(B) The Sun will rise from the west direction and set in the east direction.

Q2 (A) ✗

(B) 1 an oval (elliptical)

2 Jupiter

Q3 (A) 24 hours

(B) 1 Earth 2 The sun

Assessment ⑱ | Concept 4.2 | Lesson 3

Q1 (A) 1 c 2 a 3 c

(B) Because we are moving at the same speed of Earth.

Q2 (A) ✓

(B) 1 Sundial

2 Constellation

Q3 (A) its axis

(B) 1 Orion 2 hunter

Assessment ⑲ | Concept 4.2 | Lesson 4

Q1 (A) 1 b 2 b 3 c

(B) Because the moon reflects the sunlight falling on it.

Q2 (A) hot gases

(B) 1 Quarter 2 lunar

Q3 (A) ✓

(B) 1 New Moon 2 Full Moon

Assessment ⑳ | Concept 4.2 | Lessons 5 & 6

Q1 (A) 1 b 2 c 3 d

(B) Because it's made of hot gases and produces light and heat.

Q2 (A) ✓

(B) 1 dome 2 medium

Q3 (A) Galaxy

(B) 1 Helium 2 Hydrogen

Revision on Concepts Model Answers

Unit 3

Concept 3.1

Model Exam 1

Q1 (A) 1 b 2 c 3 c
(B) Because water causes the weathering and erosion of rocks.

Q2 (A) ✓
(B) 1 Shallow area 2 Lake

Q3 (A) Catfish
(B) 1 evaporates – renewable

Model Exam 2

Q1 (A) 1 b 2 c 3 a
(B) Because most of the fresh water on Earth is in the solid state as glaciers.

Q2 (A) Lake Nasser
(B) 1 water cycle 2 biosphere

Q3 (A) hydrosphere
(B) 1 Water lilies
2 Lake Nasser

Model Exam 3

Q1 (A) 1 b 2 b 3 d
(B) Because worms belong to the biosphere, and they hide in the soil, which belongs to the geosphere.

Q2 (A) ✗
(B) 1 Erosion 2 Oceans

Q3 (A) freshwater
(B) 1 biosphere
2 It melts and changes into liquid water.

Model Exam 4

Q1 (A) 1 d 2 b 3 c
(B) The biosphere will no longer exist.

Q2 (A) Seas
(B) 1 intertidal zone
2 atmosphere

Q3 (A) ✗
(B) 1 Dolphins: Seas or oceans
2 Salmons: Rivers or streams

Model Exam 5

Q1 (A) 1 d 2 b 3 c
(B) Intertidal zones will disappear.

Q2 (A) ✗
(B) 1 geosphere 2 ocean current

Q3 (A) biosphere
(B) 1 Ocean or sea 2 Saltwater

Concept 3.2

Model Exam 1

Q1 (A) 1 a 2 b 3 a
(B) To conserve fresh water.

Q2 (A) ✗
(B) 1 more 2 pollution

Q3 (A) decreasing
(B) 1 Mountains 2 Plains

Model Exam 2

Q1 (A) 1 c 2 c 3 b
(B) Preservation

Q2 (A) sand
(B) 1 This causes deforestation.
2 It forms a lake.

Q3 (A) ✗
(B) 1 recycling water 2 water

Model Exam 3

Q1 (A) 1 d 2 c 3 a
(B) Because the water of estuaries is a mixture of salt water and fresh water.

Q2 (A) ✓
(B) 1 Wastewater engineers
2 Oceans
Q3 (A) Seas
(B) 1 watershed
2 increase – floods

Model Exam 4

Q1 (A) 1 ✓ 2 ✓ 3 ✗
(B) To make sure that the water is safe.
Q2 (A) a
(B) 1 groundwater
2 generate electricity
Q3 (A) Rain water
(B) 1 The waste is carried by the water to other tributaries.
2 The water is polluted and becomes undrinkable.

Model Exam 5

Q1 (A) 1 c 2 d 3 d
(B) To reuse water for many purposes.
Q2 (A) ✓
(B) 1 Tributaries 2 A river
Q3 (A) Oil
(B) 1 Sustainable situation
2 Unsustainable situation

Unit 4

Concept 4.1

Model Exam 1

Q1 (A) 1 a 2 b 3 d
(B) The moon will float off into space.
Q2 (A) ✓
(B) 1 Gravity 2 Law of Motion
Q3 (A) Earth
(B) 1 more
2 Because there is no air resistance.

Model Exam 2

Q1 (A) 1 c 2 d 3 a
(B) Air resistance will increase, so the speed of his drop will decrease.
Q2 (A) ✗
(B) 1 Force 2 elliptical
Q3 (A) opposite
(B) 1 Repulsion 2 Attraction

Model Exam 3

Q1 (A) 1 b 2 b 3 b
(B) All planets will float off into space and leave their orbits around the Sun.
Q2 (A) ✗
(B) 1 decreases 2 The Sun
Q3 (A) Friction
(B) 1 The mass of objects
2 The distance between objects

Model Exam 4

Q1 (A) 1 c 2 a 3 d
(B) The gravity between the moon and Earth increases, so the moon might crash into Earth.
Q2 (A) Wood
(B) 1 gravity 2 more
Q3 (A) ✗
(B) Object 2
Because it is affected by less air resistance than the feather.

Model Exam 5

Q1 (A) 1 a 2 d 3 c
(B) Due to the friction between the tires and the ground, the bike slows down until it stops.
Q2 (A) gravity
(B) 1 Nicolaus Copernicus
2 Friction
Q3 (A) ✓
(B) 1 air resistance 2 gravity

Concept 4.2

Model Exam 1

Q1 (A) 1 a 2 b 3 d
(B) Due to Earth's rotation around its axis.
Q2 (A) ✗
(B) 1 Universe 2 Planetarium
Q3 (A) Earth
(B) 1 Orion 2 stars

Model Exam 2

Q1 (A) 1 c 2 a 3 d
(B) The day and night phenomenon do not occur.
Q2 (A) c
(B) 1 Constellation 2 Axis
Q3 (A) ✓
(B) 1 New Moon 2 Full Moon

Model Exam 3

Q1 (A) 1 c 2 a 3 b
(B) Because they are made of hot gases.
Q2 (A) Sun
(B) 1 This half of the Earth will have day.
2 The tree's shadow in the morning will be longer than that at noon.
Q3 (A) ✗
(B) 1 Rotation 2 Revolution

Model Exam 4

Q1 (A) 1 c 2 d 3 b
(B) Due to the rotation of Earth around its axis.
Q2 (A) Stars
(B) 1 Lunar month 2 Night
Q3 (A) ✓
(B) 1 Revolution of the moon around the Earth
2 Revolution of the Earth around the Sun

Model Exam 5

Q1 (A) 1 d 2 d 3 b
(B) Because the Sun is the nearest star to Earth.
Q2 (A) Crescent
(B) 1 universe
2 atmosphere
Q3 (A) ✓
(B) 1 Galileo Binoculars
2 Hubble Telescope

Assess Your Learning (School Book) Model Answers

Unit 3

- 1 d 2 c 3 a 4 d
5 b 6 c 7 c 8 a
9 b 10 d 11 c 12 c
13 b 14 b

Unit 4

- 1 a 2 a 3 c 4 a
5 b 6 d 7 b 8 a
9 d 10 a 11 a 12 c
13 a 14 a

Government Exams Model Answers

1 Cairo – Nasr City Directorate

Q1 (A) 1 c 2 b 3 d 4 b
(B) Because the mass of Earth is greater than the mass of the moon.
Q2 (A) 1 ✗ 2 ✗ 3 ✗ 4 ✗
(B) Ocean tide
Q3 (A) 1 Sun 2 star 3 clouds
4 Deepest
(B) Shadow

2 Cairo - Heliopolis Directorate

Q1 (A) 1 a 2 c 3 b 4 b

(B) Because plants absorb carbon dioxide gas from the air to make their own food through the photosynthesis process.

Q2 (A) 1 ✓ 2 ✓ 3 ✓ 4 ✗

(B) The amount of fresh water decreases or becomes scarce and it would be hard for humans to find fresh water.

Q3 (A) 1 Rocks 2 Water 3 The Sun 4 Earth

(B) Weathering of rocks

3 Giza Governorate – Osim Directorate

Q1 (A) 1 ✓ 2 ✓ 3 ✗ 4 ✗

(B) Due to Earth's rotation on its axis.

Q2 (A) 1 c 2 b 3 a 4 c

(B) Rocks

Q3 (A) 1 fresh 2 an estuary 3 solar system 4 biosphere

(B) This half of the Earth has day.

4 Giza – 6th October Directorate

Q1 (A) 1 c 2 c 3 b 4 d

(B) Because the moon reflects the sunlight falling on it.

Q2 (A) 1 ✗ 2 ✓ 3 ✗ 4 ✓

(B) The day and night cycle occurs.

Q3 (A) 1 geosphere 2 gases 3 the moon 4 fresh

(B) Earth

5 Alexandria – East Directorate

Q1 (A) 1 b 2 a 3 b 4 b

(B) An estuary is formed.

Q2 (A) 1 decreases 2 floods 3 air resistance 4 glaciers

(B) Because stars are made up of superhot gases.

Q3 1 Friction force 2 The moon 3 Gravity 4 Day and night phenomenon. 5 The solar system

6 Alex. – Montazah 1 Directorate

Q1 (A) 1 c 2 d 3 c 4 b

(B) Because the amount of fresh water on Earth is limited, so it may become scarce or run out.

Q2 (A) 1 ✓ 2 ✗ 3 ✗ 4 ✗

(B) Plants can't make the photosynthesis process to make their own food.

Q3 (A) 1 Earth 2 seas 3 east 4 pollutants

(B) Gravity

7 Alex. – Montazah 2 Directorate

Q1 (A) 1 biosphere 2 rivers 3 gravity 4 Lakes

(B) Because the moon reflects the sunlight falling on it.

Q2 (A) 1 ✓ 2 ✗ 3 ✓ 4 ✗

(B) Catfish

Q3 (A) 1 c 2 b 3 a 4 e

(B) Force

8 Alex. – Middle Directorate

Q1 (A) 1 ✗ 2 ✗ 3 ✗ 4 ✓

(B) Because the moon reflects the sunlight falling on it.

Q2 (A) 1 c 2 c 3 a 4 a

(B) This causes the death or extinction of some species of fish and amphibians that live in it.

Q3 (A) 1 b 2 c 3 d 4 a

(B) Gravity

9 Sharkia – Educational Directorate

Q1 (A) 1 First Crescent 2 96.5

3 geosphere
4 the Sun's gravity

(B) Because the moon has less mass than the mass of Earth.

Q2 (A) 1 ✓ 2 ✗ 3 ✗ 4 ✓

(B) This half of the Earth has day.

Q3 (A) 1 b 2 c 3 b 4 c

(B) 1 Orion 2 stars

10 Dakahlia – Educational Directorate

Q1 (A) 1 b 2 a 3 a 4 c

(B) Due to the revolution of the moon around the Earth.

Q2 (A) 1 ✗ 2 ✓ 3 ✓ 4 ✗

(B) The body with a mass of 400 kg because the gravity increases by increasing the mass of the body.

Q3 (A) 1 friction force 2 Full Moon
3 salt 4 biome

(B) The shadow of the tree is longer in the morning, and it becomes the shortest at noon.

11 Qalioubia – Educational Directorate

Q1 (A) 1 b 2 b 3 b 4 b

(B) 1 Rotation 2 Revolution

Q2 (A) 1 the water cycle 2 floods
3 mass 4 seasons

(B) Watershed

Q3 (A) 1 ✗ 2 ✓ 3 ✗ 4 ✗

(B) At noon

12 Beheira – Educational Directorate

Q1 (A) 1 c 2 b 3 a 4 a

(B) The planets float off into space.

Q2 (A) 1 orbits 2 Geosphere
3 universe 4 24

(B) Because Assal Lake contains a high concentration of natural salts.

Q3 (A) 1 ✓ 2 ✗ 3 ✗ 4 ✗

(B) 1 The Sun 2 The moon

13 Kafr El-Shiekh – Educational Directorate

Q1 (A) 1 b 2 c 3 b 4 a

(B) Galaxy

Q2 (A) 1 ✓ 2 ✗ 3 ✗ 4 ✗

(B) Due to Earth's revolution around the Sun.

Q3 (A) 1 less than 2 more than
3 a sea – an estuary
4 high – shortest

(B) A lake is formed.

14 Damietta – Educational Directorate

Q1 (A) 1 b 2 c 3 a 4 c

(B) Due to the rotation of Earth on its axis.

Q2 (A) 1 Constellation
2 Resources preservation
3 Earth's axis 4 Oceans

(B) The direction of the ball changes towards the Earth's surface by gravity.

Q3 (A) 1 Full Moon 2 streams
3 an elliptical (oval)
4 sand

(B) sundial – shadow

15 Port Said – Educational Directorate

Q1 (A) 1 c 2 b 3 b 4 a

(B) The solar system

Q2 (A) 1 ✓ 2 ✗ 3 ✗ 4 ✓

(B) Because the moon reflects the sunlight falling on it.

Q3 (A) 1 hydrosphere 2 estuary
3 24 4 gravity

(B) The cycle of day and night do not occur.